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Initialled abstracts and reviews, not by Bureau staff, are by G. Fox Wilson, H. G. H. Kearns of the Long Ashton Research Station and by A. M. Massee and H. M. Tydeman of the East Malling Research Station.

INDEX OF CONTENTS.

			Nos.				Nos.
MISCELLANEOUS	Abstr. 42.	Noted 12	790-832 1	VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS	Abstr. 222.	Noted 40	1062-1285n
General .. .. .	..	..	790-800	General .. .. .	..	..	1062-1083
Light effects .. .. .	..	..	801-811	Garden vegetables .. .. .	..	..	1084-1164
Growth substances .. .. .	..	..	812-821	Glasshouse crops .. .. .	..	..	1165-1175
Nutrition .. .. .	..	..	822-825	Potatoes .. .. .	..	..	1176-1241
Propagation .. .. .	..	..	826-829	Tobacco .. .. .	..	..	1242-1266
Machinery .. .. .	..	..	830-831	Other crops .. .. .	..	..	1267-1283
Noted .. .. .	..	..	832a-832 1	Noted .. .. .	..	..	1284a-1285n
TREE FRUITS, DECIDUOUS				FLORICULTURE	Abstr. 25.	Noted 6	1286-1311f
General	Abstr. 61.	Noted 8	833-894h	SUB-TROPICAL CROPS	Abstr. 59.	Noted 4	1312-1371d
Varieties and breeding .. .. .	..	..	833-844	Citrus .. .. .	..	..	1312-1360
Rootstocks .. .. .	..	..	845-858	Miscellaneous fruits .. .. .	..	..	1361-1368
Growth and nutrition .. .. .	..	..	859-866	Other crops .. .. .	..	..	1369-1370
Pollination .. .. .	..	..	867-871	Noted .. .. .	..	..	1371a-1371d
Manuring and cultural practice .. .. .	..	..	872-877	TROPICAL CROPS	Abstr. 92.	Noted 17	1372-1464q
Noted .. .. .	..	..	878-893	General .. .. .	..	..	1372-1379
SMALL FRUITS, VINES AND NUTS			894a-894h	Sweet potato .. .. .	..	..	1380-1383
General	Abstr. 33.	Noted 2	895-928b	Sugar cane .. .. .	..	..	1384-1393
Small fruits .. .. .	..	..	895-911	Tea .. .. .	..	..	1394-1400
Vines .. .. .	..	..	912-925	Coffee .. .. .	..	..	1401-1421
Nuts .. .. .	..	..	926-927	Cacao .. .. .	..	..	1422-1423
Noted .. .. .	..	..	928a-928b	Rubber .. .. .	..	..	1424-1430
PLANT PROTECTION OF DECIDUOUS FRUITS				Coconut .. .. .	..	..	1431-1433
General	Abstr. 132.	Noted 25	929-1061y	Fruit species .. .. .	..	..	1434-1445
Deficiencies and excesses .. .. .	..	..	929-931	Other crops .. .. .	..	..	1446-1463
Climatic factors .. .. .	..	..	932-940	Noted .. .. .	..	..	1464a-1464q
Viruses .. .. .	..	..	941-957	STORAGE	Abstr. 16.	Noted nil	1465-1480
Bacteria .. .. .	..	..	958-964	PROCESSING AND PLANT PRODUCTS			
Fungi .. .. .	..	..	965-968	General	Abstr. 26.	Noted 8	1481-1507h
Mites and insects .. .. .	..	..	969-981	NOTES ON BOOKS AND REPORTS			
Weeds .. .. .	..	..	982-1019	General	Abstr. 40.	Noted 3	1508-1548c
Vermin .. .. .	..	..	1020-1027	Total Abstracts 748.	Noted 125.		
Sprays and spraying .. .. .	..	..	1028-1031				
Insecticidal plants .. .. .	..	..	1032-1051				
Noted .. .. .	..	..	1052-1060				
			1061a-1061y				

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

MISCELLANEOUS.

General.

790. CULLEN, E. 634/635(931)
Dominion Horticultural Station to be inaugurated at Levin.

N.Z. J. Agric., 1947, 75: 435.

An area of about 33 acres near Levin was acquired for a Dominion Horticultural Station in January, 1947. The station will ultimately be staffed and equipped for the investigation of fundamental problems of horticulture on a long-term programme, as well as for dealing with the day-to-day problems of the commercial growers of vegetables, small fruits and flowers. An investigation has

already been started into the causes of the present low yields of many commercial raspberry plantations, coupled with the planting of extensive trials of the best varieties at present available in New Zealand. Variety trials of black currants have also been planted up with a range of material from various sources.

791. ANDERSSSEN, F. G. 634/635(68)
Horticultural problems: research and control work [in South Africa].

Fmg S. Afr., 1947, 22: 1073-81.

The following items are taken from this report. *Citrus*. In the permanent fertilizer project phosphate is no longer the

only limiting factor, nitrogen having become a second limiting factor in the 13th year. Ammonium sulphate decreased the fruit size and juice content and increased the acidity and rind thickness of Valencia oranges. Superphosphates and kraal manure had the opposite effect. Potash fertilizers increased the acidity of the fruit. The beneficial effects of cover-crops were reported from Nel-spruit where plots receiving no nitrogen, but with a cover crop, yielded twice as much as those without cover crop. Notwithstanding this increase such yields are only about 80% of the crop from plots receiving inorganic nitrogen or manure. Experiments in the western Transvaal have shown that nitrogen applied as ammonium (e.g. ammonium sulphate) may have very deleterious effects. The development of a technique of analysing citrus leaves has made it possible to diagnose various nutrition problems. In several experiments oranges from trees heavily fertilized with N have shown a lower vitamin C content than those from trees half-starved of nitrogen. *Deciduous fruit.* In trials at Vaalhartz with a large number of varieties both phosphatic and nitrogenous fertilizers have now become essential, whereas N gave no positive results earlier in the trials. In rootstock studies apricots budded on Marianna plum stock were better than those on peach stock, the probable explanation being that the peach stock is deeper rooted and so penetrates through the subsoil to the lime below. Rome Beauty apples grafted on "sweet apple" stock were more vigorous than those on Merton 793, which were in turn more vigorous than those on Northern Spy. Rootstock studies of pears on different stocks are also reported. *Pineapples.* At Bathurst 46 varieties were still under trial. Many of those imported have proved similar to the common local varieties, Queen and Smooth Cayenne. Many crosses have been made between these two varieties, with very promising results. *Vegetables.* Brief reference is made to progress in breeding and selection. Inbred lines of several vegetables are being established. Strains of tomato resistant to bacterial wilt and fusarium wilt are being used to breed a resistant commercial tomato. *Floriculture.* Physiological disorders, due to deficiency of zinc or other trace elements, have been found in flowers.

792. CIRIACY-WANTRUP, S. V. 63(794)
Major economic forces affecting agriculture with particular reference to California.
Hilgardia, 1947, 18: 1-76, bibl. 20.

A study concerned with major economic forces affecting farmers in the U.S.A. regardless of type of product and district.

793. MINISTRY OF AGRICULTURE. 634/635
Commercial horticulture: advice to beginners.
Adv. Leaflet. Minist. Agric. Lond. 236, 1947, pp. 5.

After an opening word of warning setting out the attributes necessary in a successful commercial horticulturist, the rest of the leaflet is devoted to brief notes on: preliminary training, choice of district, kinds of holdings (extensive, intensive, and glasshouse culture), how to acquire land, capital outlay. Attention is called to the help provided by the National Agricultural Advisory Service and the publications of the Ministry.

794. MINISTÈRE DE L'AGRICULTURE. 63(072)(44)
Travaux effectués par les stations agronomiques de 1939 à 1945. (Work of French Agronomic Stations between 1939 and 1945.) [In French and English.]
Avignon, 1947, pp. 172+159.

This volume has been issued to close the gap in the dissemination of scientific information caused by the war and the occupation of France. Abstracts in French and English are given of the principal research papers published by workers at the agronomic stations during this period. Most of those likely to interest our readers have already appeared in *Horticultural Abstracts* from papers published in *C.R. Acad. Agric. and Ann. agron.* [see also abstract 881].

795. NESTEROVIČ, N. D. 58.006(47)
The Botanical Garden of the Academy of Science of the White Russian S.S.R. [Russian.]
Priroda (Nature), 1947, No. 10, pp. 83-7.

A description of the botanical garden of 106 hectares at Minsk. Among other features mentioned are two new greenhouses with over 10,000 examples of decorative and greenhouse plants. The fruit garden, occupying 12 ha., is almost complete. It contains many varieties of apple, pear, plum, sweet and acid cherries, and the soft fruits, currants, raspberry and gooseberry, are also represented. There is a collection of citrus plants and varieties of grapevine. Successful work has also been done there on the introduction of varieties of vine suitable for White Russia.

796. SHANTZ, H. L. 581.5: 63
Applied ecology in land management.
Bull. ecol. Soc. Amer., 1947, 28: 64.

A discussion of the basic problems which should be the chief concern of the practical-minded ecologist.

797. STUART, N. W. 631.589: 663.61
About hydroponics.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 289-92.

The author sets out to correct some of the false impressions in the mind of the public regarding soilless culture, and shows its limitations and possibilities. The water culture, sand culture and sub-irrigation methods are briefly described. Some useful details are given of the materials used in constructing and filling the beds or benches used in sub-irrigation.

798. ISELY, D. 585.1: 581.48
Investigations in seed classification by family characteristics.
Res. Bull. Ia agric. Exp. Stat. 351, 1947, pp. 317-80, bibl. 43, illus.

The following 17 families are treated, being those which appear to contain the greatest number of the more important agricultural and weed plants in the U.S.A.: gramineae, cyperaceae, polygonaceae, chenopodiaceae, amarantaceae, caryophyllaceae, cruciferae, rosaceae, leguminosae, euphorbiaceae, malvaceae, umbelliferae, convolvulaceae, labiatae, solanaceae, plantaginaceae and compositae. A synopsis of family characteristics is given in the form of an analytical key. The description of each family is prefaced by a short note on the principal diagnostic characters followed by discussions on morphology, external characteristics, associated structures and classification by seed characters.

799. KRUYT, W. 547.944.6
Colchicine en de praktische toepassing er van.
(Colchicine and its practical application.)
Meded. Direct. Tuinb., 1946, 9: 10-19, bibl. 8
[received 1948].

A review of the constitution of colchicine and its action on cell division, plant morphology and physiology, and of methods of application, together with a discussion on its practical potentialities.

800. SCHNELLE, F. 551.5: 633/635
Phänologische Andauerkarten von Europa.
(Phenological charts for Europe.)
Kühn Arch., 1943/44, 60: 98-104 [received 1948].

The charts indicate the number of days elapsed between apple blossoming and winter rye harvest and between the flowering and harvest of winter rye during the period 1930-1939.

Light effects.

801. WÍTHROW, A. P., AND WITHROW, R. B. 581.14: 581.035
Plant growth with artificial sources of radiant energy.
Plant Physiol., 1947, 22: 494-513, bibl. 21, being
J. Pap. Purdue agric. Exp. Stat. 272.

The authors grew China aster, Nobel spinach, Biloxi soybean and Indiana Baltimore tomato with artificial lighting for varying photoperiods at 15°, 20° and 25° C. The high pressure mercury arc produced the smallest plants because its radiant energy is concentrated at the blue end of the spectrum. White and daylight fluorescent lamps produced vigorous stocky plants at the higher temperatures. Plants growing under incandescent lamps produced the greatest fresh and dry weight, but they were undesirably tall and spindly, and filtering the infra-red light through water failed to improve them. It is concluded that fluorescent lamps are the best available sources of artificial light for experimental work, although they are not altogether satisfactory.

802. GABRIELSEN, E. K. 581.13
Threshold value of carbon dioxide concentration in photosynthesis of foliage leaves.
Nature, 1948, 161: 138-9, bibl. 4.

Leaves of elder (*Sambucus niger*) were exposed to light in a closed chamber containing air. The concentration of CO₂ fell rapidly to 0.009% volume, at which level it remained. When leaves were exposed in air containing only 0.0024% CO₂, the concentration increased to 0.0089%, the rate of production of CO₂ agreeing closely with that found in the respiration of elder leaves in the dark. The author concludes that CO₂ assimilation ceases when a threshold value of CO₂ concentration is reached, and that the rate of CO₂ production from respiration is the same in light as in the dark.—Royal Veterinary and Agricultural College, Copenhagen.

803. STILES, W. 581.13
Photosynthesis.
Sci. Progr., 1947, 35: 577-89.

A review of recent work which has served to emphasize the complexity of photosynthesis. Two new techniques should assist progress—the use of radioactive tracers and work on isolated chloroplasts.

804. STCHÉPOTIEV, F. L. [SČEPOTYEV]. 581.035
On photoperiodic after-effect in woody plants as connected with the age of seedlings.
C.R. Acad. Sci. U.R.S.S., 1947, 56: 91-4, bibl. 7.

Experiments with oak and osage orange (*Maclura aurantiaca* Nutt.) seedlings, during the growing season. The seedlings of *Maclura* are very sensitive to the short photoperiodic treatment. On the first days of the experiment after the seedlings were restored to natural day conditions, their growth ceased, and the apical bud was formed. There was striking dwarfness and absence of thorns in plants treated with the short photoperiod for 10 and 15 days.

805. BORTHWICK, H. A. 581.035: 581.145
Day length and flowering.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 273-83.

A popular account of some of the practical results which have come about through the study of photoperiodism in plants. Some of the experimental work is described and its application to various crops, including soybeans and chrysanthemums, discussed.

806. BLACKMAN, G. E., AND RUTTER, A. J. 581.035: 585.722
Physiological and ecological studies in the analysis of plant environment. III.* The interaction between light intensity and mineral nutrient supply in leaf development and in the net assimilation rate of the bluebell (*Scilla nonscripta*).
Ann. Bot. Lond., 1948, 12: 1-26, bibl. 22.

When light is reduced from full daylight to 0.11 daylight the total leaf-area of the bluebell is increased; the ratio

unit leaf-area to unit leaf-weight bears an inverse linear relation to the logarithm of light intensity over that range. The net assimilation rate is directly proportional to the logarithm of light intensity; this relationship also holds for the sunflower. By extrapolation, assimilation would cease at about 0.089 daylight; this agrees with the degree of shading where the bluebell ceases to occur.

807. WILSON, C. C. 581.11
The effect of some environmental factors on the movements of guard cells.
Plant Physiol., 1948, 23: 5-37, bibl. 34.

From his experiments with *Camellia japonica* and *Ligustrum japonicum* the writer derives an equation connecting stomatal aperture with light intensity *I*, temperature *t*, and vapour pressure deficit *v*, viz. $Y = 0.067 I (t+4) - 0.002 I v (t+4)$. There appeared to be no causal relation between photosynthesis and stomatal opening. Guard cells on leaves devoid of chlorophyll responded to light.—University of Georgia.

808. PUCHER, G. W., AND OTHERS. 587.15: 581.192
Studies in the metabolism of crassulacean plants: the diurnal variation in organic acid and starch content of *Bryophyllum calycinum*.
Plant Physiol., 1947, 22: 360-76, bibl. 19.*

In the leaves of *Bryophyllum calycinum* the main diurnal changes were the decrease by day and increase by night in malic and citric acid, and opposite changes in starch. The behaviour of glucose allowed it to be considered as an intermediate in the reactions concerned in these changes. The stem tissue showed small changes; starch decreased and glucose increased at night.—Connecticut Agricultural Experiment Station.

809. PUCHER, G. W., AND OTHERS. 587.15: 581.192
Studies in the metabolism of crassulacean plants: the behaviour of excised leaves of *Bryophyllum calycinum* during culture in water.
Plant Physiol., 1947, 22: 477-93, bibl. 6.

Leaflets were cut from plants of *Bryophyllum calycinum* and cultured for two days with their bases in water. In leaflets started in the greenhouse in the afternoon, organic acids, particularly malic, increased during the night and decreased during the day, while starch pursued an opposite course. These changes agree with those reported for leaflets on the plant.† In leaves collected in the afternoon and cultured in darkness, organic acids generally increased during the first day and decreased during the second; starch decreased during the first day and then increased. In leaves started in the morning and cultured in darkness, organic acids generally decreased, though citric acid increased; starch increased continuously during the 2-day period in darkness. The changes in organic acids and starch can largely be accounted for by assuming a system of enzymatic reactions analogous to the Krebs tricarboxylic acid cycle.—Connecticut Agricultural Experiment Station.

810. PUCHER, G. W., AND OTHERS. 587.15: 581.192
Studies in the metabolism of crassulacean plants: the effect of temperature upon the culture of excised leaves of *Bryophyllum calycinum*.
Plant Physiol., 1948, 23: 123-32, bibl. 10.

Young leaflets of *Bryophyllum calycinum* picked in the afternoon were cultured in the dark for 6 days at 20°, 9° and 1° C. Changes in organic acids and starch were similar to those already reported (*ibid.*, 1948, 22: 477, see previous abstract). The formation of acids and decrease of starch was greater at 9° C. than at 20° C., possibly because the oxidation of starch to organic acids liberates energy and so should be promoted by decrease in temperature. At

* For parts I and II see *ibid.*, 1946, 10: 361, and 1947, 11: 26; *H.A.*, 17: 1133.

* See also *H.A.*, 17: 1878.

† See previous abstract.

1° C. these changes were slower than at 9° C. but almost as extensive.—Connecticut Agricutlural Experiment Station.

811. PUCHER, G. W., AND OTHERS. 587.15: 581.192
Correction of data for protein nitrogen in leaves
of *Bryophyllum calycinum*.
Plant Physiol., 1948, 23: 149-51, bibl. 5.

The correction has been taken into account in the foregoing abstracts.

Growth substances.*

812. MITCHELL, J. W. 577.17
Plant growth regulators.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp.
256-66, bibl. 10.

A general account of growth regulating substances is followed by some examples of the practical uses to which they are already put. Some other possible uses for growth regulators are also mentioned, e.g. to hasten ripening in bananas, to bring about more even ripening in apples and pears, to quicken the curing of parsnips after harvesting, to advance flowering and fruiting in pineapples, to improve keeping qualities in apples, to induce fruit set in blackberries, to prevent growth of weed seeds in farmyard manure, to control the chemical composition of plants, to protect mould cultures from bacterial infection.

813. TINCKER, M. A. H. 577.17
The control of phases of plant growth by means of
chemical regulators. Part I.
Chem. Industr., 1948, No. 11-12, pp. 163-5,
181-4, bibl. 128.

A rapid but comprehensive review of present knowledge of plant growth substances. Reference is made to the control of flowering, parthenocarp, abscission, fruit ripening and selective weed killing.

814. NORMAN, A. G. 577.17
Agronomic uses for plant growth-regulators.
J. Amer. Soc. Agron., 1948, 40: 111-9.

An address on the possibilities of weed control by the use of growth substances. The lack of progress towards extensive practical application of the techniques now being tested is deplored.

815. WURGLER, W. 577.17
Les acides phénoxyacétiques substitués et le
géotropisme des plantes. (The influence of
substituted phenoxyacetic acids on geotropism
in plants.)
Rev. hort. suisse, 1948, 21: 2-5, bibl. 5.

The apex showed positive geotropism when certain plants were sprayed with growth substances of the phenoxyacetic group. 2,4-D, MCPA, and 2,4,5-trichlorophenoxyacetic acid were used.

816. THIMANN, K. V., AND BONNER, W. D. 577.17
The action of tri-iodobenzoic acid on growth.
Plant Physiol., 1948, 23: 158-61, bibl. 6.

Under certain conditions tri-iodobenzoic acid may promote the effect of auxin on growth.

817. AUDUS, L. J., AND QUASTEL, J. H. 577.17
The growth-inhibitory activity of the sulphonamides and plant growth-substances, and the effects thereon of *p*-aminobenzoic acid.
Ann. Bot. Lond., 1948, 12: 27-34, bibl. 15.

Root-growth inhibition by sulphonamides appears to be quite distinct from sulphonamide bacteriostasis and from inhibition by growth substances.—University College, Cardiff.

* See also 827, 892, 894e, 923, 951, 977, 1020-1026, 1098, 1114, 1135, 1148, 1149, 1155, 1163, 1188, 1201, 1202, 1299, 1300, 1309, 1334, 1376-1379, 1388, 1404, 1405, 1426, 1522.

818. LACHIONDO, F. B., AND LOPEZ, A. C. 577.17
Sobre el empleo de un excipiente hidrosoluble en las técnicas de aplicación de fitohormonas. (On the use of a water-soluble medium for the application of growth substances.) [English summary ½ p.]
Anal. Inst. españ. Edafol. Ecol. Fisiol. veg., 1947, 6: 583-7.

Lanette Wax SX, a commercial preparation of partially esterified cetyl and stearic alcohols, is easier to use as a vehicle for growth substances than lanolin.

819. SCHOCKEN, V. 577.17
Bound auxin.
Abstr. in Amer. J. Bot., 1947, 34: 602-3.

The author's hydrolyses of purified proteins lead him to suggest that the indoleacetic acid alleged to be bound to proteins may be a transformation product of tryptophane which appears during the hydrolysis of the protein.—University of Illinois, Urbana, Ill.

820. GRAY, R., AND BONNER, J. 577.17
An inhibitor of plant growth from the leaves of
Encelia farinosa.
Amer. J. Bot., 1948, 35: 52-7, bibl. 20.

The leaves of *Encelia farinosa*, a composite shrub of the deserts in the south-west of the United States, inhibit the growth of various other plants. A substance toxic to tomato seedlings was isolated from the leaves.—Calif. Inst. Technology, Pasadena.

821. MACVICAR, R., AND TOTTINGHAM, W. E. 546.27: 577.17
A further investigation of the replacement of boron
by indoleacetic acid.*
Plant Physiol., 1947, 22: 598-602, bibl. 6.

No significant alleviation of boron deficiency by indoleacetic acid was noted in sand culture under normal greenhouse conditions with tomato, cotton, sunflower, soybean, and tobacco plants. [Authors' summary.]—University of Wisconsin.

Nutrition.

822. TIEDJENS, V. A. 581.13
Relationships of ampholytes to assimilation and
recovery of ammonium and nitrate nitrogen in plant
tissue.
Bot. Gaz., 1947, 109: 95-107, bibl. 23.

Data are presented which show that nitrate and ammonium ions may not be recovered from living tissue in absolute amounts. This results from the fact that protoplasm contains proteins and amino acids which have amphoteric properties and which form dissociation compounds with nitrate and ammonium ions which obey the laws of electrochemistry. The conditions in cells necessary to support the above assumption are suggested, together with an explanation of conditions which favor nitrogen assimilation and subsequent growth in plants. [Author's summary.]—Virginia Truck Experiment Station, Norfolk, Va.

823. DE LA BORBOLLA Y ALCALA, J. M. R. 631.811.8
La influencia del cloro sobre las plantas. (The effect of chlorine upon plants.)
Anal. Inst. españ. Edafol. Ecol. Fisiol. veg., 1947, 6: 145-66, bibl. 62.

It is at present impossible to formulate general rules concerning the effects of chlorine on plants, as they depend on species and variety, soil, climate, etc. However, carbohydrate metabolism is affected and the absorption of Ca and Mg increased by Cl, which also increases the rate of oxidative processes. [From author's summary.]—Seville.

* See H.A., 10: 817.

824. ŠKOLNIK, M. JA. 631.811
The problem of the microelements in the light of recent information. [Russian.]
Priroda (Nature), 1947, No. 9, pp. 42-9.
An historical review of work on microelements in biology, but without any bibliographical references.

825. HEWITT, E. J. 581.14: 631.811
Relation of manganese and some other metals to the iron status of plants.
Nature, 1948, 161: 489-90, bibl. 23.
Seed culture experiments with sugar beet indicate that the effects of Fe and Mn are independent. Other metals may be more active than Mn in inducing iron-deficiency symptoms.—Long Ashton Research Station, Bristol.

Propagation.

826. BRADFORD, F. C. 634/635
Short cuts for the gardener.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 267-72.
The undermentioned practices and equipment are briefly described and their advantages discussed: the plunging of potted plants in greenhouses, using peat, sand or gravel; the raising of seedlings in shredded sphagnum moss, a particularly useful method for cinchona seedlings; the mechanical humidification of greenhouses; the raising of cuttings in expanded vermiculite; the use of opaque propagating houses fitted with fluorescent lamps and of small propagating cases equipped with thermostatically controlled bottom-heat units and fluorescent light. The raising of seedlings under fluorescent lamps and the higher light intensities required by them compared with cuttings are also touched on.

827. VAN HOLDER, J. 631.535.7
Het stekken van bladeren. (Propagation from leaves.)
Cultuur Hand., 1947, 13: 9: 17.
A list is given of plants which can be raised from leaves, particularly after treatment with indolebutyric acid.

828. LEGRAND-FORESTIER, A. 631.535.6
Le bouturage par tronçons de racines. (Propagation by root cuttings.)
Courr. hort., 1947, 9: 576.
The propagation of woody and herbaceous plants from root cuttings is described and a list is given of ornamental trees that are particularly suitable for propagation by this method.

829. SWINNERTON, A. A., AND RIPLEY, P. O. 633.529.4
The agricultural use of peat materials.
Publ. Dep. Agric. Canada 803, 1947, pp. 15, being *Fmrs' Bull.* 147.
Notes on the formation and origin of peat and the composition of peat bogs is followed by a description of moss peat manufacture and the uses of peat moss.

Machinery.*

830. GRAY, K. B. 631.51
Some new farm machines.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 815-6, illus.
Among new developments mentioned are: a cultivator using a flame to kill weeds; a potato harvester that digs, gathers, grades, sacks, weighs and delivers the potatoes to a waiting truck; a sugar-cane harvester that cuts the cane and loads it while travelling at 7 or 8 m.p.h.

831. CUMINGS, G. A. 631.8: 631.51
New fertilizer machines.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 827-31, bibl. 2.
Brief, general descriptions are given of some newer machines, including "deep-placement" types and machines for applying liquid fertilizer to irrigation water or direct to land. Mention is made of special equipment for applying anhydrous ammonia and similar materials, which are applied as a liquid under pressure, provision being made for the immediate closing of the furrow in which it is applied, to prevent the escape of gas.

Noted.

832. a AJON, G. 581.14
Il valore di azione dei fattori di accrescimento. (The effect value of growth factors.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1938, 15: 17-23, bibl. 3 [received 1948].
b AJON, G. 581.1
Determinazione del raggio degli ioni idratati. (Determination of the radius of hydrated ions.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941, 16: 181-91, bibl. 4 [received 1948].
c AJON, G. 581.1
Idrofilia ionica e viscosità. (Ionic hydrophilicity and viscosity.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1948, 17: 16-21, bibl. 2.
d CAMBRIDGE UNIVERSITY. 016: 63
A summary of the papers published by the members of the staff of the School of Agriculture and its associated research institutes during the period Oct. 1st, 1946-Sept. 30th, 1947.
Mem. Sch. Agric. Camb. 19, 1948, pp. 26, 2/-.
e DENNY, F. E. 581.12
Semi-micro method for measuring the amount of oxygen consumed and carbon dioxide produced in plant respiration.
Contr. Boyce Thompson Inst., 1947, 15: 47-60, bibl. 6.
f GRAHAM, E. R. 631.417
Determination of soil organic matter by means of a photoelectric colorimeter.
Soil Sci., 1948, 65: 181-3.
g HOMEYER, P. G., CLEM, M. A., AND FEDERER, W. T. 519
Punched card and calculating machine methods for analyzing lattice experiments including lattice squares and the cubic lattice.
Res. Bull. Ia agric. Exp. Stat. 347, 1947, pp. 171, bibl. 20.
h HUDGINS, H. N. 631.811: 546.27
Boron fertilizer recommendations by States extracted from references cited June 1947.
(Publ.) Amer. Potash Inst., 1947 [?], pp. 28. Refers to the U.S.A.
i KELLY, S. 581.12: 577.17
The relationship between respiration and water uptake in the oat coleoptile.
Amer. J. Bot., 1947, 34: 521-6, bibl. 35.
j MAHESHWARI, P. 581.33
The angiosperm embryo sac.
Bot. Rev., 1948, 14: 1-56, bibl. 241.
k MINISTRY OF AGRICULTURE. 63(42): 334.6
Report of the Committee appointed to review the working of the agricultural marketing acts.
Economic Series Minist. Agric. Lond. No. 48, H.M.S.O., London, 1947, pp. 96, 2s. 6d.
l UNITED STATES DEPARTMENT OF AGRICULTURE. 63(73)
Workers in subjects pertaining to agriculture in land-grant colleges and experiment stations 1946-47.
Misc. Publ. U.S. Dep. Agric. 625, 1947, pp. 118.

* See also 1064, 1513.

TREE FRUITS, DECIDUOUS.

General.

833. NEL, R. I. 634.1/8(68)
Strengthening the fruit industry.
Fmg S. Afr., 1947, 22: 1138-55.
 A progress report of research in the cultivation and breeding of fruits at Stellenbosch and other places in Cape Province. Among items of interest are the following:—Peaches.—If the Kakamas peach is to produce grade fruit for canning it must be severely pruned. Delayed foliation.—In early peaches this trouble can be overcome by late pruning. Irrigation.—Irrigation was greatly facilitated by applying a straw mulch in a prune orchard; penetration was deeper, soil temperatures on hot days were reduced, and the cost of mulching was very much less than the increase in value of the crop.
834. KELL, J. 634: 658.7/8
 L'écoulement de la production fruitière dans le cadre de l'accord Benelux. (The sale of fruit within the Benelux confederation scheme.)
Fruit belge, 1948, 16: 30-1, 42-8.
 A discussion of the economic elements which are likely to play an important part in the disposal of fruit in Belgium, Holland and Luxembourg.
835. CARRANTE, V. 634.1/2(458)
 Per il miglioramento della frutticoltura in Sicilia con particolare riguardo alla zona etnea. (The improvement of fruit growing in Sicily especially on the slopes of Mount Etna.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941, 16: 27-102 [received 1948].
 This interesting account of the important fruitgrowing district of Sicily lying on the slopes of Etna was issued as a prelude to a planned revival of the industry based on observance of modern hygiene and modern methods of cultivation. Only deciduous species are considered, namely apple, pear, cherry, peach, plum and apricot, and lists and descriptions of varieties are given. In the apples it may be remarked that only very recently have the North American varieties Jonathan and Delicious been introduced by the Acireale Station. For both apple and pear local seedling rootstocks are preferred. Quince under existing conditions is short-lived.
836. BREVIGLIERI, N. 634.1/8(45)
 Frutticoltura italiana. (Fruit growing in Italy.)
Ital. agric., 1947, 84: 677-82.
 The author urges that, if Italian orchards are to recover from the effects of war neglect and damage, it is essential to concentrate first on two objects, namely: the provision of known and healthy material, and hygiene in the orchard.
837. EVREINOFF, V. A. 634.1/7(47)
 L'arboriculture fruitière en Russie. (Tree fruits in Russia.)
Arbres et Fruits, 1947, No. 22, pp. 3-9; 1948, No. 23, pp. 3-10.
 A short description, with map, of the main fruitgrowing regions of the U.S.S.R. The Russian fruitgrowing industry, apples being the main crop, is comparable in size with that of the U.S.A., which it will surpass in about 10 years. The export of fruit from Russia is insignificant at present but the potentialities are said to be enormous.
838. FARISH, L. R. 634.25(762)
 Mississippi Delta peach culture.
Bull. Miss. agric. Exp. Stat. 444, 1947, pp. 19, bibl. 46.
 A guide to the growing of peaches in the Yazoo-Mississippi

Delta. Spring frosts are not serious in the open Delta area. Cultivation is essential. Recommendations are made for the control of pests and diseases.

839. EVREINOFF, V. A. 634.2
 Les fruits à noyaux. (Stone fruits.)
 Flammarion, Paris, 1938, pp. 185, illus., 90 fr. [received 1948].

The main crops covered by this book are peach, plum, cherry, almond and apricot; shorter sections deal with *Cornus mas*, *Prunus spinosa* and *P. fruticans*. The main cultural operations from propagation to packing are described succinctly, and measures to control pests and diseases are given. Artificial smoke and orchard heating for reducing spring frost damage are described.

840. EVREINOFF, V. A. 634.1/5(44)
 Les arbrisseaux à fruits. (Bush fruit trees.)
 Flammarion, Paris, 1947, pp. 133, illus., 125 fr.

The largest section of this book is devoted to the cultivation of the fig. In the north of France figs are often planted on a gentle slope, and trained so that the wood may be laid on the ground and buried in the autumn to avoid frost damage. Hazel nut, pomegranate, jujube, gumi (*Elaeagnus multiflora*), and loquat are described more briefly, with emphasis on the possibility of extending their cultivation northwards. [Some of this material has already appeared in *Rev. Hort. Paris*.]

841. BALLANTYNE, J. A. 634.63
 The growing of olives.
Agric. Gaz. N.S.W., 1947, 58: 540-1.

The reasons for the lack of interest in olive culture in New South Wales are set out and the possibilities of its extension in the Commonwealth are discussed.

842. AMMAL, E. K. J. 634.38
 The origin of the black mulberry.
J. roy. hort. Soc., 1948, 73: 117-20, bibl. 2.

This mulberry, *Morus nigra*, which has not been recorded in the wild state, is reputed to have originated in Persia. Cytological evidence is produced suggesting that the home of this species (2n=308) may be nearer the mountains of Central China, "which was probably the centre of origin of the genus *Morus*".

843. ANON. 634.1/2: 633.584.3
 De beteekenis van de ondercultuur van vriend in boomgaarden in de provincie Utrecht. (The importance of growing willows under fruit trees in the Utrecht province.)
Fruittel, 1947, 37: 2: 12-13; 37: 3: 20-2.

An account is given of growing willows between rows of fruit trees to occupy the ground profitably while the trees are still young. A moist soil is essential. Apple, pear, and to a less degree plum, but not cherry orchards are suitable; the cherry requires a lighter and less low-lying soil than that in which willows thrive.

844. ANON. 634.11-1.55
 Bi-annual cropping of apples in Bangalore.
Leaf. Dep. Hort., Mysore State 22, 1943, pp. 8 [received 1948].

This leaflet appears to be a fuller version of an article of the same title by H. C. Javaraya published in the *Indian Journal of Horticulture*, 1943, 1: 31-4. It describes the method by which apples in Mysore State in tropical India are made to produce two crops of fruit regularly in 12 to 15 months. [For method, see *H.A.*, 14: 520.]

Varieties and breeding.

845. ANON. 634.11
 N.Z. trials of new British apple.
Orchard. N.Z., 1947, 20: 10: 8.

Three trees of Tydeman's Early Worcester apple (*H.A.*,

16: 1794), bred at the East Malling Research Station, England, have been brought to New Zealand by the Fruit-growers' Federation and are being grown at the Plant Research Bureau at Auckland and at the Levin nursery of the Federation.

846. FORESTER, E. D. 634.11
Apple cropping at Auckland. Five varieties compared.

Orchard. N.Z., 1947, 20: 10: 2-6.
The five varieties described are Alfriston, Cox's Orange Pippin, Jonathan, Granny Smith and Giant Jeniton. Their good and bad points are tabulated.

847. LONG ASHTON RESEARCH STATION. 634.11: 663.3
Cider varieties recommended for post-war planting. (Mimeographed) *Circ. Long Ashton Res. Stat.*, 1947, pp. 4.

The following varieties, divided into the four groups, namely sharps, sweets, bittersharps, and bittersweets, are recommended for general planting in S.W. England:—Sweet: mid-season, Court Royal and Sweet Alford; late, Sweet Coppin. Bittersweet: early, Bulmer's Norman; mid-season, Tremlett's Bitter and Yarlington Mill; late, Ashton Brown Jersey, Dabinett, Tardive Forestier. Bittersharp: mid-season, Improved Foxwhelp, Kingston Black, Stoke Red. Sharp: early, Blackwell Red; mid-season, Crimson King. A supplementary list is given of other varieties suitable for local planting in Devon, Gloucester, Hereford, Monmouth, Worcester and Somerset. Some orchard characters of the recommended varieties are tabulated in an appendix.

848. BRADFORD, F. C. 634.11: 663.813
The beverage apples. *Fruit Prod. J.*, 1947, 27: 107-11, bibl. 21.

In discussing the need for growing apples specifically for the apple juice industry the writer gives an account of the cider apples grown in England and France, some of which are growing at Glen Dale, Md. Siberian and native crab apples, which can be grown in a more severe climate, would provide extra astringency for blending, but they are somewhat deficient in sugar. New types may possibly be raised by crossing *Malus coronaria* (2n=68) with the common apple. In any case further study is necessary before fruit growers can be encouraged to make extensive plantings of apples for juice production.

849. AUBERT, P. 634.11
Variétés de pommes finlandaises pour la montagne. (Finnish apple varieties for high altitudes.) *Rev. romande Agric. Vitic.*, 1947, 3: 5-7.

An account of the performance of the varieties Lavia, Sariola, Keltainen Kaneeli (Yellow Cannelle) and Okerö, introduced to Switzerland from Finland in 1937. They are promising for the local production of apples for home consumption.

850. ŽAVORONKOV, P. A. 634.11-1.523
Breeding apples in the Urals. [Russian.] *Agrobiologija*, 1946, Nos. 5-6, pp. 83-95.

Apple breeding experiments at the Celjabinsk Fruit and Vegetable Experiment Station, in the southern Urals, are described. The main problem was to raise frost-resistant varieties of good quality. By hybridizing the Siberian crab with commercial varieties seedlings were obtained showing different degrees of winter hardiness. The greatest number of winter-resistant hybrids were obtained in families where the pollinators were winter-resistant, local, mid-Russian and Mičurin's varieties. Hybrids of Siberian crab bore fruit weighing on an average 6-12 g., those of Red Rennet weighed 36 g. The hardiness of many of these seedlings was satisfactory.

851. VAN TIENHOVEN, P. 634.13(492)
De plaats van stoofperen in ons fruitsortiment. (The place of cooking pears in Dutch orchards.) *Fruiteelt*, 1948, 38: 100-1, 116-7.

A plea is made for a more intensive culture of culinary pears in Holland. Six varieties considered suitable (five of them illustrated) are described, viz. St. Remy, Harm Harkes, Brederode, Gieser Wildeman, Kleipeer and Provisepeer.

852. RÜDER, K. 634.22-1.521
Sortenkundliche Untersuchungen an *Prunus domestica*. (The identification of *Prunus domestica* varieties.) *Kühn Arch.*, 1940, 54: 1-132, bibl. 24 [received 1948].

Flower, fruit (exocarp and mesocarp), stone (endocarp), leaf, one-year-old shoots during the winter rest, and tree shape were studied in about 130 *Prunus domestica* varieties. The stone was found to be the least variable and therefore most reliable character on which to base variety identification. Fourteen pages of photographic plates give a detailed illustration of varietal stone characters.

853. NATIVIDADE, J. V. 634.22
Os abrunhos. (*Prunus insititia*.) [Summary in English and French.] *Bol. Junta nac. Frutas*, Lisbon, 1947, 7: 253-61.

Prunus insititia is subspontaneous in almost all parts of Portugal. There are several good types of damson and mirabelle but fruit growers in Portugal have not been interested in them. The Linnean species is discussed in its relation to *P. domestica* and the value of some of the subspontaneous forms is pointed out. It is suggested that these forms should be grown on a larger scale in those regions where the soil and climate are not favourable for the more valuable species.

854. GUZZINI, D. 634.23(45)
Il ciliegio. (Cherry varieties grown in Italy.) *Ital. agric.*, 1947, 84: 495-507.

This article is a strong plea for concerted work to standardize cherry production in Italy so that cherry exports may be resumed and increased. Excellent work has been done in certain districts, but there has never been any chance of pooling the knowledge gained and the prospect of doing so would appear to have become even less since the abolition of the "consorzi della ortofrutticoltura" [Horticultural Associations set up and fostered by the former government].

855. HAVIS, L., WEINBERGER, J. H., AND HESSE, C. O. 634.25(73)
Better peaches are coming.

Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 304-11.

The basic objectives in breeding new peach varieties in the U.S.A. are described and some recent achievements recorded. The following new varieties introduced by the U.S.D.A. since 1942 are briefly described: Corona, Carolyn, Amador, Cortez, Dixigem, Dixired, Southland. U.S.A. consumers now prefer varieties with a bright red skin, yellow-fleshed types being in greater demand than white.

856. MORRIS, H. F. 634.25(764)
Peach varieties for central east Texas. *Bull. Tex. agric. Exp. Stat.* 687, 1947, pp. 62, bibl. 10.

The author surveys the behaviour of more than 200 peach varieties over eight years at Nacogdoches, Texas. New varieties recommended for this district, where winter chilling may be inadequate for the old standard varieties, include Halehaven, Viceroy, Vedette, Newday, Triagem and Golden East.

857. MORETTINI, A. 634.63: 581.144/5
Gli "olivi a doppia fioritura" ed il noto fenomeno della prefioritura autunnale. ("Double flowering" olives and the phenomenon of autumn flowers.)
Ital. agric., 1947, 84: 401-6, illus.
The author has now had an opportunity of observing the habit of the two trees in question [see *ibid.*, 83: 276; *H.A.*, 17: 593] over two seasons and his original suspicion that it is not a case of real double cropping is confirmed. The pseudo-fruits which had given rise to the legend of double fruiting consist merely of the axes of the inflorescences carrying in them the more, or less swollen ovaries of the flowers. Premature autumn flowering in the olive is not unknown and is liable to occur when long hot spells are followed in autumn by rain and continued hot-weather. This merely anticipates normal flowering in the spring and is a nuisance when it occurs.

858. VIDAL, V. A. C., AND LEFÈVRE, P. M. 634.63
A côr do azeite: sua relação com o clima, o solo e as variedades de oliveira. (The colour of olive oil: its relation to climate, soil and variety.)
[English summary $\frac{1}{2}$ p.]
Agron. lusit., 1945, 7: 253-60 [received 1948].
Environmental and oil extraction conditions influenced the degree of transparency more than did varietal differences, which were small.

Rootstocks.

859. GERSONS, L. 634.1/2-1.541.11
De teelt van vruchtboomonderstammen. (Raising fruit tree rootstocks.)
Meded. Direct. Tuinb., 1947, 10: 641-53, illus.
A report of a study journey through Switzerland and Italy with special reference to observations on the rootstock industry in Italy.
860. MEIER, K., BRYNER, W., AND NIKLAUS, L. 634.11-1.541.11
Versuche mit auf typisierten E.M.—Unterlagen veredelten Apfelhochbüschen. (Experiments with highbush apple trees on E.M. rootstocks.)
Landw. Jb. Schweiz, 1948, 62: 138-92, bibl. 6.
This is a description of Swiss trials of six scion apple varieties, Gravensteiner, James Grieve, Bedfordshire Foundling, Champagne Reinette, Reinette grise de Vignat and Glockenapfel (Pomme Cloche), on East Malling rootstocks I, II, IX, XII and XIII. The introduction summarizes a preliminary report which appeared in 1938 (*H.A.*, 8: 972) and then the article records further observations on the trees with reference to stem girth, annual growth of shoots, yield, and the spread of the branches. With regard to rootstock influence on girth the results for the first four varieties agree with those obtained at East Malling. The other two show some divergence; the positions are changed for Bedfordshire Foundling on I and XIII and for Reinette de Champagne on I, II and XIII. The influence on length of shoot growth as recorded in England was maintained for the varieties Gravensteiner, Reinette grise de Vignat and Glockenapfel on IX and XII. As regards James Grieve and Champagne Reinette the trees on II are more vigorous than those on I, and for Bedfordshire Foundling those on I more vigorous than those on XIII. The yields have been too low for definite conclusions to be drawn, but in general the yields per variety were in the following ascending order: Bedfordshire Foundling, Reinette grise de Vignat, Gravensteiner, Champagne Reinette, Glockenapfel, James Grieve. The spread of the trees varies with the variety and the rootstock; it is least with IX and greatest with XIII and XII. A representative tree for each variety on each rootstock is illustrated. The practical conclusions drawn from the trials are as follows:—No. IX can be recommended for all varieties of great and

moderate vigour, but not for those that soon come into bearing and have high yields, even on suitable soil, for it is too weak. No. II is of medium vigour and suitable for trees in gardens; it is compatible with all varieties but in poor or clay soils the roots are less branched than in the nursery. No. I is the rootstock to use for weak varieties, but it can also be used for vigorous varieties for half-standard trees of moderate size. No. XIII should be used for standard trees only. No. XII produces very vigorous trees and is suitable for very fruitful varieties such as James Grieve and Champagne Reinette, particularly for large pyramid trees; for most varieties, however, it should be used only for half-standards or rather small standard trees; it has a better root-system than XIII.

861. BRYDEN, J. D. 634.11-1.541.11
Apple rootstock investigations: testing English stocks at Bathurst. A progress report.
Agric. Gaz. N.S.W., 1948, 59: 37-42.
A rootstock trial at Bathurst Experiment Farm includes a number of East Malling rootstocks, and this report indicates various trends in growth and yields observed, or becoming apparent, in the trees at twelve years old. The data obtained are recorded in tables and graphs. E.M. stocks I, XII, XIII, XV and XVI show no outstanding features for growth and development at this stage. There is considerable variation in their behaviour with different scion varieties, which indicates differing degrees of compatibility and points to a definite influence of scion over stock. In nearly all cases E.M. XII has shown poor cropping ability to this stage. The poor results in growth and yields so far achieved with E.M. XII and E.M. XV suggest that these stocks are unsuitable under conditions similar to those at Bathurst. Granny Smith trees worked on East Malling stocks seem to be inferior in most respects to those on Northern Spy and seedling roots. Northern Spy combinations have maintained comparatively good size in fruit, despite the fact that this stock is amongst the highest producing combinations. East Malling stocks have not shown any ability to impart outstanding characteristics in size of fruit and colour quality.
862. DIJKSTRA, G. K. 634.11-1.541.11
Onderzoek op het gebied van appelonderstammen. (Apple rootstock investigations.)
Fruiteelt, 1947, 37: 44-5.
A discussion on the advantages of using vegetatively raised rootstocks in preference to seedlings, with reference to the work done at East Malling, and with data of results obtained in Holland with Belle de Boskoop and Cox's Orange Pippin on eight of the E.M. rootstocks.
863. GERRITSEN, J. D. 631.541.11: 634.11 + 634.13
Onderstammen in de Betuwe. (Rootstocks in the Betuwe district.)
Fruiteelt, 1947, 37: 414-5.
A discussion, with data on yields, of apple varieties on certain East Malling rootstocks in the Betuwe district of Holland, with particular reference to planting permanent and temporary trees, and the use of vigorous and dwarfing rootstocks. For permanent pear trees seedling rootstocks are recommended with quince A as rootstock for the temporary trees.
864. PETERSEN, E. O. 634.22-1.541.11
Plum tree stocks: some interesting experiments.
N.Z. Gdnr., 1948, 4: 295-9.
Some varieties of Japanese plums seem to have a peculiar affinity for the nectarine. Burbank, Santa Rosa and Wright's Early budded upon stocks raised from stones of a seedling nectarine resembling Goldmine proved to be more free growing and came into bearing two seasons earlier than the same varieties of plum budded upon stocks raised from stones of the peach Hobb's Late.

865. WILSON, W. 634.1/2-1.541.1
A scion storage.
Amer. Fruit Gr., 1948, 68: 2: 17.
The writer stores grafting material until early summer in a box 30 in. x 42 in. x 24 in. deep; the top is 6 in. below ground level. The roof is covered with mulch and below the slatted bottom is an air space of 6 in.

866. WRIGHT, P. H. 634.1/2-1.541
Propagation of own-root fruit trees and understocks.
Canad. Gr., 1948, 71: 1: 14-15.
The writer suggests that the Kerr method of grafting scions on inverted root pieces to induce scion rooting (*Proc. Amer. Soc. hort. Sci.* for 1945, 1936, 33: 355; *H.A.*, 6: 659) might prove more practical than mound layering for the propagation of rootstocks.

Growth and nutrition.

867. JAKOVLEV, P. N. 581.02: 634.1/8
The influence of environmental factors on fruit biology. [Russian.]
Agrobiologija, 1946, No. 4, pp. 57-64.
The following are discussed: (1) The variation in the hybrid progeny from the same and different assemblages of chromosomes (variation according to the chromosome number of seedlings in a cross *Prunus spinosa* x *Persica vulgaris*). (2) Changes in predominating characters of the hybrid in relation to environment (changes in leaf form of plum x apricot hybrids in response to changes in the weather). (3) Mixed inheritance in a hybrid of the cross Japanese plum x peach (as shown by the intermediate form of the leaves). (4) The mentor as a factor in altering the nature of plants (differences in leaf shape of a hybrid pear according to whether it has quince as rootstock only or as rootstock and framework).

868. KEMMER, E. 634.11: 581.45
Über Blattmodifikationen bei Apfelgehölzen. (The variation of leaf shape in apple seedlings.)
Reprint from *Züchter*, 1947, 17/18: 378-82, bibl. 2.
In their development apple seedlings do not pass through a genuine juvenile phase with a characteristic leaf shape as do certain other plants such as *Chamaecyparis pisifera squarrosa*, where the juvenile leaf shape can be preserved by vegetative propagation. In the apple one can only speak of a primary phase marked by such characters as thin, very serrate and partly lobed leaves with an open-meshed net of veins and the premature formation of lateral shoots. The duration of this phase can be temporarily extended by propagation on clonal rootstocks, but eventually the habit of the adult tree will show itself. On the other hand, the primary phase can be shortened, as compared with the natural development of the seedling, by working it on a dwarfing rootstock. Other instances are given to show that the characteristics of a certain developmental phase can be modified by external factors. Even old apple trees (worked) may exhibit the wildling habit of a young seedling when cut back severely.—*Inst. Obstbau, Univ. Berlin*.

869. EVREINOFF, V. 634.25: 581.46
Quelques observations sur la biologie du pècher. (Some observations on the biology of the peach tree.)
Reprinted from *Rapp. gen. Congr. pomol. France*, Perpignan, 1947, pp. 12.
The author divides the blossoming of the peach into four phases: beginning of bloom—when the first flowers open, full bloom—when half the flowers are open, completion of full bloom—when more than half have shed their petals, and end—when petal fall is complete. Fertilization is most likely to occur during full bloom, if the weather allows bees to effect pollination. Unfruitfulness in the peach is due mainly to defects in the stamens, pollen or pistils, which are

caused either by cold during the four or five weeks before blossoming, lack of nitrogen, or by excessive heat or drying winds during full bloom. Varieties that ripen within 75-80 days produce no viable seeds, and germination improves as ripening is prolonged. Within limits the yield of a tree is independent of the number of flowers it produces. Varieties with normal flowers tend to be fruitful. Because most of the fruit is borne at the middle levels of the tree, this should be trained to a horizontal oval shape.—*Station de la Flambelle, Toulouse*.

870. ESAU, K. 634.13: 581.144.2
Vascular differentiation in the pear root.
Hilgardia, 1943, 15: 299-324, bibl. 15, illus. [received 1948].
The material used in preparing the slides and photomicrographs was obtained from *Pyrus communis* trees grown in culture solution at Berkeley, Calif. Comparison with soil-grown roots of seedling Winter Nelis pears showed no fundamental differences. Observations on the development of the different parts are set out in detail.

871. MORETTINI, A. 634.63: 581.144.2
Gli olivastri ed il loro sistema radicale. (Wild olives and their root systems.)
Ital. agric., 1947, 84: 508-18.
The author shows with photographic illustrations how the wild olive root develops and spreads. The tap root quickly disappears in favour of adventitious roots which arise from the swellings formed on the portion of trunk below the surface. These roots are essentially superficial, i.e. they grow for the most part in the top 30 cm. of soil, while in cultivated olives the roots in the area immediately below that worked by cultivation are few in number. The radial spread of roots is more than 2 or 3 times the height of the tree.

Pollination.

872. DESAYMARD, P. 634.1/7: 581.162.3
La mise à fruit des arbres fruitiers. (Setting of fruit in fruit trees.)
Thesis, Univ. Toulouse, 1948, 120 pp.
The first part of this thesis concerns fruit-setting in relation to internal factors (genetics, cytology, parthenocarp) and external factors (pollination, physiology, pathology, environment). In the second part an account is given of observations on apples, particularly the variety Canada Reinette, which is found to be self-sterile. The results of pollinating this variety with pollen from a number of other varieties are described. White Calville and Red Calville proved to be good pollinating varieties, while Reine des Reinettes and Reinette du Mans were incompatible with Canada Reinette.
873. GERRITSEN, J. D. 581.162.3: 634.11+634.23
Bestuiving en stuifmeelonderzoek. (Pollination and pollen investigation.)
Fruittelt, 1947, 37: 90-1.
A note on testing pollen for percentage germination, with data on the results of artificially pollinating Sterappel and Wijnkers (Wine cherry) from other varieties of apple and cherry respectively.

874. BUTLER, C. G. 634.1/8: 638.12
The relationship of bees to fruit and seed crops.
Farming, 1947, 1: 177-81, illus.
The importance of the honey-bee to the fruitgrower and farmer is only gradually being realized. The author discusses the balance between bees and flowers, describes some habits of bees and refers to recent experiments on the possibility of directing honey-bees whereby they are made to visit predetermined crops and to neglect other flowers to which they would otherwise go in preference. It is estimated that honey-bees are responsible for the pollination of about 4 million pounds worth of fruit per annum in Britain.

875. CHAI HOON KIM. 634.13: 581.162.3
An inquiry into the factors affecting the shape of Bartlett pear fruits, with special reference to xenia, metaxenia and pollination.
Ph.D. Thesis Ore. State Coll., June, 1946, mimeographed, pp. 78, illus.

The Bartlett pear as grown under the conditions in the Willamette Valley, Oregon, was found to be partially self-fruitleful and fruits developed parthenocarpically following self-pollination. It was found that the varieties Fall Butter, Anjou and Winter Nelis were the most satisfactory pollinizers for Bartlett. Fruits developed from cross-fertilization with those varieties contained seeds, while those resulting from self-pollination did not. Failure of fertilization appeared to be due to the inability of the pollen tubes to reach the ovary following pollination and not to defectiveness of pollen or lack of ability to germinate. Xenia and metaxenia were observed shortly after pollination of the flower blossoms. Rapid degeneration of the megagametophyte took place after self-pollination, but active growth of the embryo was initiated after cross-pollination. The development or non-development of the embryo appeared to be correlated with the rate of cell division and cell enlargement in specific fruit tissues. Following the first cell division of the zygote, there was a marked increase in the number and size of cells in the immediate vicinity of the carpels. In the fruits containing degenerating megagametophytes, however, more rapid increase in cell numbers in the tissues occurred in the region between the base of the carpels and the pedicel. This differential growth persisted throughout development and accounts for the variation in shape at maturity between the self- and cross-pollinated Bartlett pear fruits.
H.M.T.

876. ENIKEEV, H. K. 634.13: 581.162.3
The effect of cross pollination and selfing in the pear variety Vladimir. [Russian.]
Agrobiologija, 1946, No. 4, pp. 140-1.

The results show that a judicious choice of pollinating varieties considerably increases yield in Russian orchards.

877. BEVILACQUA, I. 634.23: 581.162.3
L'autosterilità del ciliegio. (Self-sterility in cherries.)
Ital. agric., 1947, 84: 653-6.

Pollination experiments in the Province of Modena have resulted in showing (1) that particular cherry varieties grown on a commercial scale in that Province are self-sterile and (2) that each is capable of adequate cross-pollination by certain other varieties here named. Attention to interplanting should produce reasonable crops.

Manuring and cultural practice.*

878. MAGNESS, J. R., BATJER, L. P., AND REGEIMBAL, L. O. 634.11-1.84
Apple-tree response to nitrogen applied at different seasons [in Maryland and Virginia].
J. agric. Res., 1948, 76: 1-25, bibl. 17.

The fruit set, colour and yield of relatively old York Imperial and Delicious apple trees were not influenced by season of nitrogen application. When sodium nitrate was applied to the soil in early or late fall there was greater downward leaching of nitrate than when it was applied in spring or midsummer. Nitrogen content of blossoms, shoots, leaves, bark, wood, and roots did not indicate any large or consistent differences due to time of nitrogen application. After four years there was no difference between autumn and spring applications in the nitrogen reserve contained in the various tissues of the tree. If the level of nitrogen metabolism is satisfactorily maintained within the tree there seems to be little difference at what season of the year the soil supply is replenished. With young Starking Delicious,

* See also 831, 1518.

Rome Beauty, and York Imperial trees, late spring and midsummer application of nitrate nitrogen resulted in a higher nitrogen level in the foliage, which in turn was associated with greater growth, and in Rome Beauty with less fruit colour.

879. EDGERTON, L. J. 634.11-1.83
The effect of varying amounts of potassium on the growth and potassium accumulation of young apple trees.
Plant Physiol., 1948, 23: 112-22, bibl. 8.

One-year-old McIntosh and Delicious apples on French Crab were grown for two seasons in sand culture with nutrient solutions containing from 0 to 400 p.p.m. of K. No deficiency symptoms were observed during the first season; potassium deficiency was apparent in the second season when less than 50 p.p.m. K was supplied. Potassium may be absorbed freely by the apple beyond the amount necessary for maximum growth.—Cornell University.

880. WANDER, I. W. 634.1/2-1.83
The effect of cultural and fertilizer treatments on the potassium content of soil, leaves, and fruit of apple trees, including a study of new methods of potassium analysis.
Abstract of *Doctoral Dissert. Ohio State Univ.* 50, 1946, pp. 9 [received 1948].

The K content of apple leaves and fruits is related to available K in the soil. Although no treatment used induced K deficiency, soil mulching reduced the fixation of K applied as fertilizer, and continuous straw mulching produced large amounts of exchangeable K without the addition of potash fertilizers.—Ohio Agric. Exp. Stat.

881. DROUINEAU, G., AND NAGEOTTE, M. 634.25-1.8
Influence du mode d'application d'une fumure complète sur la nutrition des arbres fruitiers. (Influence of the method of application of a complete fertilizer on the nutrition of fruit trees. Work at French stations.) [In French and English.]
Abstr. in *Trav. Stat. agron. 1939-1945*, 1947, pp. 89 (French) and 81 (English).

A complete fertilizer was applied to peach trees growing in a calcareous clay, either lightly dug in round the tree or injected at a depth of 40 to 50 cm. by means of a lance. Analysis of shoots indicated that superficial manuring was ineffective for raising the P content and had but little effect on the K content, while lance application resulted in increased P and K, but decreased Mg. The failure of part of a balanced fertilizer, applied superficially, to reach the root system is wasteful and upsets the balance of the elements.

882. ROSS, A. A. 634.1/2-1.874
The growing of green manure crops in the orchards of the Stanthorpe district [Queensland].
Qd agric. J., 1947, 65: 389-95, illus.

To ensure reasonable orchard crops in this district it has been found necessary to apply organic matter regularly to the soil, the only practical means for doing this being by interplanting with green manures, preferably legumes. In the absence of irrigation water summer-growing green manures cannot be used, as they would deprive the fruit trees of too much water. For this reason winter-growing species must be selected, but extreme conditions in winter prevents the use of many plants. The behaviour of the following is briefly described and instruction is given for planting and turning in: New Zealand blue lupin, golden tares, field peas, tick or horse beans, vetches, clovers, black winter rye, wheat, barley and oats. New Zealand blue lupin and black winter rye have proved the most successful. They should be sown in manured land in January or early February and are usually turned in during August, the crop being mixed with the top 2-3 inches of soil by shallow cultivation and not deeply buried. It may be

necessary to inoculate the soil with the appropriate bacterium before sowing lupins.

883. ROSS, A. A. 634.1/7-1.874
Management of the orchard soils of the Stanthorpe district.

Qd agric., 1948, 66: 13-19, illus.

The most economical and effective method of fertilizing these orchard soils is to apply fertilizer to the green manure crop to be ploughed in: for leguminous green manures 2½ cwt. per acre of a 4 : 15 : 2 mixture and for cereal green manures 1½ cwt. of ammonium sulphate, or its equivalent. Frequent cultivation of these soils does not conserve moisture beyond retaining that which would otherwise be consumed by weeds. On the other hand, it hastens the depletion of humus and has a bad effect on soil structure. Shallow, trashy cultivation is better than deep working and clean weeding, as it reduces the tendency of a soil to erode, improves the structure of the surface, increases the absorption of water during falls of rain and reduces evaporation of moisture.

884. STENUIT, D. 634.1/7-1.42
L'analyse du sol et son application dans la culture fruitière. (Soil analysis in relation to fruit culture.)

Fruit belge, 1947, 15: 21-34.

Soil analysis is discussed under the following headings: (1) The evolution of soil analysis in recent years. (2) The determination of lime requirements when manuring the soil. (3) The examination of soils in orchards, and a study of soil profiles.

885. DERMINE, E. 631.513: 634.1/8
Les explosifs au service de l'arboriculture. (The use of explosives in the orchard.)

Fruit belge, 1948, 16: 3-7.

Explosives are discussed, particularly in relation to their use in orchards, for (1) the removal of tree stumps, (2) the preparation of holes in which to plant fruit trees, (3) the fertilization of the soil by means of explosives, part of the charge being fertilizer material. The merits of this last method of manuring are compared with those of manuring by fertilizer lance.

886. VAN DEN MUIZENBERG, E. W. B. 634.1/7-1.67
De watervoorziening in de boomgaard. (Providing water in the orchard.)

Fruittelt, 1947, 37: 416-7.

Methods for supplying fruit trees with water during dry weather are described (with illustrations) under 1, underground watering, 2, surface irrigation, and 3, above-ground spraying by (a) large rotary sprayers (rain guns), (b) small sprayers, (c) oscillating pipes with holes.

887. SAUBLENS, L. 634.1/2-1.546
Plantations fruitières. (Training and pruning fruit trees.)

Courr. hort., 1947, 9: 573-4, 637-9; 10: 31-2, 104-5.

The author describes and illustrates various methods of training and pruning fruit trees including such methods as palmette Verrier, simple palmette with horizontal branches, and palmette Cossonet (combined oblique and horizontal palmette).

888. MERRILL, G. 631.542: 634.1/2
Power pruning in California.

Amer. Fruit Gr., 1947, 67: 12: 22, 31.

A commercial grower describes his experience using shears operated by compressed air to prune peach trees. As the trees were 16 ft. high most of the work was done from a platform 10 ft. × 16 ft. mounted 8 ft. above the ground on a tractor; the compressor, worked by a separate engine, was towed on a trailer. At each stop between two trees, spaced 20 ft. × 22 ft., the four pruners on the platform each dealt

with a quarter of a tree, while the driver pruned the lower limbs. The cost was rather less than that of pruning by hand; it could be lowered by running the compressor from the tractor's power take-off, and extending the tractor controls to the platform. The lower branches would be pruned by hand later.

889. BABUGLIA, W., AND SERVETTI, R. R. 631.542: 634.11 + 634.25
La poda del duraznero y del manzano. (Pruning peaches and apples.)

Rev. Asoc. Ingen. agron. Montevideo, 1947, 19: 35-53, illus.

Pruning methods for frame building, to induce fruiting and to promote rejuvenation are described for the apple and the peach.

890. MACLEAN, G. A. 634.11-1.542
Pillar system of pruning.

Grower, 1948, 29: 129.

A grower explains his system apparently applicable to apples. "Trees grown on the pillar system consist of a central stem about 7 ft. high, with one- and two-year-old laterals radiating from it. The laterals are treated simply on the same basis as with the renewal principle, the unpruned one-year lateral being left to form fruit buds during the following year. The year after fruiting, the lateral is cut hard back to the main stem. In this way any expansion in the spread of the tree is prevented and is limited to the length or spread of the one-year unpruned laterals. Plant distances normally adopted are between 5-6 ft. in the row and 10-12 ft. between rows. A 7 ft. high mature tree, after winter pruning, carries between 12 and 15 one-year laterals and an equal number of two-year laterals. The crop from a mature tree, given good weather conditions, has averaged more than 20 lb. of first class fruit." The advantages claimed by the author for the pillar system are considerable. [See *H.A.*, 15: 999. [At 6 × 12 ft. he would have 605 trees per acre. If they averaged 20 lb. per tree, the crop would be 300 bushels per acre. At present prices and provided there were a crop each year the method might be economic.—Ed.]

891. FRENCH, B. O. 634.25-1.542.24
Thinning of canning peaches for better yields of larger fruit.

Agric. Gaz. N.S.W., 1948, 59: 27-30.

The author advocates drastic thinning, and discusses how many fruits are required per tree, and when and how to thin.

892. MITCHELL, A. E., HAMNER, C. L., AND TOENJES, W. 634.11: 577.17

Use of 2-methyl-4-chlorophenoxyacetic acid as a preharvest spray to prevent drop of McIntosh apples.

Quart. Bull. Mich. agric. Exp. Stat., 1947, 30: 113-7, bibl. 4.

In this test 2-methyl-4-chlorophenoxyacetic acid (MCPA) was applied at 20 p.p.m. as a spray, to mature McIntosh apple trees, derived from bud sports, a commercial naphthaleneacetic acid preparation being applied as a wet dust for comparison. The treatments were made 21 and again 13 days before the commercial harvesting time; the weather was unseasonably cold for 10 days after the first application. At the harvest date the drop was as follows: untreated 48-52%, NAA 10-90%, MCPA 5-13%. Nine days after harvest only 24% of the fruit had fallen from trees treated with MCPA.

893. WHITTAKER, E. C. 634.1-1.55: 664.85.11/13
Cool storage of apples and pears. Importance of harvesting maturity.

Agric. Gaz. N.S.W., 1947, 58: 649-53.

Three mechanical aids to maturity determination, the colour chart, the pressure tester and the iodine test, are briefly described, with notes on the length of the picking

period. Apple varieties which need special care are mentioned.

Noted.

894. a BATTIATO, C. 634.13: 581.45/46
Diafisi frondo—floripara e fillodia in *Pirus communis* L. (Leaf: flower diaphysis and phylloidy in the pear.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1948, 17: 13-14, illus.
- b BLASER, H. W., AND EINSET, J. 634.11: 575.255
Flower structure in periclinal chimeras of six apple sports.
Abstr. Amer. J. Bot., 1947, 34: 580.
- c DE BRITO SOARES, M. 634.1/8(469)
Os frutos do Algarve. (Fruits from the Province of Algarve, Portugal.)
Bol. Junta nac. Frutas, Lisbon, 1947, 7: 262-8. Production figures are given.
- d DERMINE, E. 634.1/8-1.55
La saisonnement des arbres fruitiers. (Biennial bearing in fruit trees.)
Fruit belge, 1947, 15: 7-10.
Reasons and recommendations.

- e NATIVIDADE, J. V. 577.17: 634.1/7
As fitohormonas no combate à queda dos frutos. (Phytohormones for preventing fruit drop.)
Bol. Junta nac. Frutas, Lisbon, 1947, 7: 125-34. A review in Portuguese.
- f OZBEK, S. 581.162.3: 634.11 + 634.13
Çiçek tomurcugu (Fruit bud differentiation and pollination in apples and pears in the Kastamonu district of Turkey.)* [German summary 3½ pp.]
Çalışmalar: Sayı 143 T.C. Ziraat Vekâleti Ankara Yüksek Ziraat Enstitüsü Rektörlüğü, 1943, pp. 88, bibl. 39 [received 1948].
- g SCHMID, W. 634(494)
Le fruit suisse. L'organisation commerciale du fruit en Suisse. (Swiss fruit and its commercial organization.)
Fruit belge, 1948, 16: 33-41.
- h ŠVAGR, ZD. 634.1/7(42)
Ovocnářský výzkumný ústav East Malling—Anglie. (The Fruit Research Station at East Malling, England.)
Ovocnické Rozhledy, 1947, 38: 82-4.
In Czech.

* Abridged translation available on loan.

SMALL FRUITS, VINES AND NUTS.

Small fruits.*

895. EVREINOFF, V. A. 634.7
Les arbustes à baies. (Soft fruits.)
Flammarion, Paris, 1944, pp. 151, illus., 90 fr. [received 1948].

Fruits treated at length in this book are red and black currants, gooseberry, raspberry, dewberry and loganberry; the barberry and caper are also described. The text gives a concise guide to the cultivation of the various crops in France.

896. HUDSON, J. P. 634.7
Small fruit profits depend on clonal races.
N.Z. J. Agric., 1947, 75: 353-4.

The importance of using clonal material with a proved capacity for yielding regular crops is emphasized, with special reference to black currants and the loganberry. It is by no means certain that the true loganberry is grown at all in New Zealand and there is good reason to suppose that some of the strains are more fruitful than others. Only the best types should be propagated.

897. DAVEY, M. 634.71
The culture of boysenberries.
Orchard. N.Z., 1947, 20: 9: 2-5, illus.

An account of cultural operations, propagation, and disease and pest control of the boysenberry. Three methods of training are described: the Californian, the four-wire and the six-wire systems.

898. (MINISTRY OF AGRICULTURE.) 634.711
Cultivation of raspberries.
Adv. Leaflet. Minist. Agric. Lond. 180, 1947, pp. 4.

A growers' leaflet. Short notes are given on the chief characteristics of the following varieties, old and new: Lloyd George, Norfolk Giant, Newburgh, St. Walfried, Malling Promise, Malling Landmark and Malling Enterprise. The importance of planting only canes which have been certified as virus-free is stressed.

899. HUDSON, J. P. 634.711
The growing of raspberries from suckers and seeds.
N.Z. J. Agric., 1947, 75: 449-50.

The necessity for propagating raspberries from clonal

* See also 790, 1071.

material is stressed. To keep nursery material pure, seedlings must be avoided, and special nursery beds, where fruiting is not allowed, are recommended when varietal propagation is the object. There is, however, scope for raising new varieties of raspberry from seed, for no varieties specially suitable for growing in New Zealand have as yet been produced there.

900. DARROW, G. M. 634.73
New varieties of blueberry.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 300-3.

Two late varieties, Atlantic and Pemberton, and one very late kind, Burlington, are briefly described. The aims of breeding work are set out and a list is given of crosses made in 1945 using rabbiteye, high bush, dryland, Florida evergreen and deerberry types.

901. WASSCHER, J. 634.737-1.8
De invloed van grondsoort en bemesting op de vegetatieve groei van de blauwe bes (*Vaccinium corymbosum* L.). (The influence of soil and manuring on the vegetative growth of the highbush blueberry.) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, 10: 375-82.

The growth of 2-year-old bushes of highbush blueberries on an acid peat soil was much more vigorous than on an acid and drier sandy soil. An application of ½ kg. of a fertilizer containing 15% N, 18% P₂O₅ and 24% K₂O per bush for two consecutive years to older bushes resulted in growth twice as strong as that of untreated bushes.

902. WASSCHER, J. 634.737-1.535
Verslag over stekproeven met de blauwe bes in 1944. (Report on experiments in propagating the highbush blueberry in 1944.) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, 10: 430-6, bibl. 5.

Rooting of softwood cuttings of the highbush blueberry (*Vaccinium corymbosum* L.) was better in a box frame than in a cold frame. Cuttings from manured plants usually rooted better than those from unmanured plants. The cuttings should be taken before July. There was no difference in the percentage of rooted plants from cuttings taken from plants of different ages. The lower parts of the

twigs gave somewhat better results than those taken higher up. Better results were obtained from hardwood cuttings planted deeply than from those planted with about half their length above ground.

903. BELJERINCK, W., AND WASSCHER, J. 634.737
Opbrengstproeven met de blauwe bes (*Vaccinium corymbosum* L.) gedurende de jaren 1942 tot en met 1944. (Yield trials with the highbush blueberry from 1942 to 1944 inclusive.)

Meded. Direct. Tuinb., 1947, 10: 492-500, bibl. 8.

Trials on yields of highbush blueberries were carried out on three types of soil differing in their proportions of peat and sand. Applications of a commercial fertilizer containing 15% N, 18% P and 24% K₂O at the rate of $\frac{1}{2}$ kg. per bush resulted in higher yields on all plots, particularly on the most sandy plot. By manuring, the time of picking was advanced by 1 to 3 weeks. The yields of a number of varieties are compared.

904. DARROW, G. M. 634.75(73-79)
Finer strawberries ahead.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 293-99.

A short account of the aims and methods of strawberry breeders in the U.S.A. is followed by a list of species and varieties which are notably superior in certain plant or fruit characters.

905. SMOLJANINOVA, N. K. 634.75-1.523
Hybrids of wild and garden strawberries. [Russian.]
Agrobiologija, 1946, Nos. 5-6, pp. 96-101.

The F₁ generation of crosses between wild and garden strawberries consisted of plants of different degrees of fertility or sterility. Some did not flower at all and so were completely sterile, others flowered but did not set fruit, while others flowered but produced only few seeds. Some bore deformed berries because of incomplete setting, while others produced fruit of a normal shape.

906. KRONENBERG, H. G., AND MACHIELSE, B. 634.75
Aardbeiselectie voor Kennemerland. (Strawberry selection in Kennemerland.)
Meded. Direct. Tuinb., 1946, 9: 20-9 [received 1948].

It would seem that in the Kennemerland district of Holland there is no healthy strawberry plant material under cultivation. The author recommends that propagation should be carried out in isolated plots where no other strawberries are grown and where the conditions are favourable for propagating healthy plants. It is estimated that Kennemerland requires 3 million plants yearly and the whole of Holland 27 millions. In connexion with the transmission of virus diseases by aphids it is suggested that the propagation and selection of strawberry plants is best done in a region with a cool, rather severe climate, and attempts are being made in north Holland. Some protection may be necessary, however, and a windbreak is recommended.

907. DARROW, G. M., AND OTHERS. 634.75-1.523: 577.16
Breeding strawberries for vitamin C.

J. Hered., 1947, 38: 363-5, bibl. 4.

It appears that the already high content of ascorbic acid in the strawberry may be raised by breeding.—Bur. Pl. Ind., U.S.D.A.

908. REID, R. D. 634.75-1.523
Strawberry breeding at Auchincruive.
Scot. Agric., 1948, 27: 218-23, bibl. 15.

An account of breeding strawberries for resistance to red core disease caused by *Phytophthora fragariae*. The raising of re-selected stocks of Auchincruive Climax, a resistant variety, at various centres is described. Break-down of resistance and other strawberry problems are discussed.

909. GRAY, G. F. 634.75: 63(766)
Factors affecting selection of strawberry varieties for Oklahoma.

Bull. Okla. agric. Exp. Stat. B-311, 1947, pp. 11.

The choice of varieties recommended for growing in Oklahoma (*ibid.*, B-304, 1947; *H.A.*, 17: 1254) was based on the following characteristics, discussed in this bulletin: (i) runner development, (ii) frost injury to blossoms, (iii) summer hardiness, (iv) size of berry, (v) firmness of berry and (vi) flavour or quality.

910. HARTMANN, H. T. 634.75: 581.03
Some effects of temperature and photoperiod on flower formation and runner production in the strawberry.

Plant Physiol., 1947, 22: 407-20, bibl. 9.

Strawberry plants of the Missionary variety were grown in artificial day lengths at controlled temperatures. No runners were produced by plants subjected to alternating periods of 10 hours light and 10 hours darkness; runners were produced when the cycle was lengthened to 14 hours light and 14 hours darkness. Flowers were formed under both regimes. Exposure to seven short photoperiods resulted in flower formation by plants subsequently moved to long days; exposure to three short photoperiods failed to cause photoperiodic induction. Flower formation occurred in plants held under long day conditions, provided one leaf was subjected to short photoperiod; the stimulus could be transmitted to runner plants growing in long days from parent plants growing in short days. The reproductive response to short days was little affected by temperatures used in these experiments.—University of California.

911. KLINKENBERG, C. H., AND KRONENBERG, H. G. 634.75
Aardbeiplanten ziekten, teelt en selectie. (Strawberry diseases, culture and selection.)
Uitgeversbedrijf voor de Tuinbouw N.V., The Hague, 1947, 28 pp., illus.

A popular account of the diseases, pests and cultivation of the strawberry in relation to the propagation of healthy stocks from selected clones. In the first part are described the most important diseases and their control under 1. Virus diseases (yellow-edge, crinkle and witch's broom, and the vectors of strawberry virus diseases). 2. Black root rot. 3. Canker. 4. Eelworm disease. 5. Strawberry tarsonemid mite. 6. Red spider mite. 7. Leaf spot diseases. 8. Mildew. 9. Stem rot. 10. June yellows. In the second part, on culture and selection, the authors discuss 1. Methods of selection. 2. Commercial selection and propagation. 3. Soil. 4. The relation of selection to other operations. 5. Time of planting. 6. Spacing. 7. Protection from wind and intercropping. 8. Deblossoming. 9. Training the runners.

Vines.

912. DE MARNEFFE, R., AND DUMORTIER, A. 634.8(493)-1.544
La situation de la viticulture en Belgique. (Belgian viticulture.)

Rapp. 1.^{re} Stat. provinc. Recherch. sci. Vitic. la Hulpe, 1947 [?], pp. 51.

The authors review the economic position of Belgium vine growing. It is undertaken nowadays entirely under glass and is almost entirely dependent on foreign markets for sales. The area devoted to the crop forms a quadrilateral, of which the north-west and north-east angles respectively are Brussels and Louvain and the south-east corner Wavre. In 1946 some 35,000 glasshouses were devoted to vines. In 1930 the variety most generally grown was Gros Colman followed by Royal (Terheyden) and then, a long way behind, by the white varieties Muscat of Alexandria, Frankenthal, etc. Other varieties now under trial are (black) Jubilé and Leopold III, (white) Gildé. The present

aim at la Hulpe is to produce a good seedless variety. Methods of packing, transport and marketing are noted. There has not been very much real research as yet, though attempts have been made to solve the problem of what to do with hail damaged grapes, and to promote grape juice production. Events of 1940 prevented the establishment of a station for the study of vine diseases.

913. MARIMAN, G. 634.8
La viticulture septentrionale. (Northern vine growing.)
Arbres et Fruits, 1948, 25: 3-9; 26: 16-30.

After reviewing the evidence of vine cultivation in the north of France and Belgium until a few decades ago, the author indicates how the industry should be built up again. Suitable varieties and rootstocks are discussed.

914. DALMASSO, G. 634.8(47)
Viticultura ed enologia nella Russia sovietica.
(Vinegrowing and wine making in Russia.)
Ital. agric., 1947, 84: 428-31.

In 1936 a development plan drawn up by the Lenin Academy of Sciences aimed at more than doubling the acreage under vines in European Russia and bringing it up to some 860,000 hectares, so that by 1950 Russia should be the fourth greatest vine growing nation in the world. The distribution aimed, very roughly, at equal areas in Bessarabia, Transcaucasia, Ukraine and Russia in Asia, with rather smaller tracts in the Caucasus, the valleys of the Don and Volga, the Crimea and the Far East. Most of the vines are *Vitis vinifera* varieties such as Riesling, Semillon, Cabernet, etc. Viticultural schools have been set up in the different areas. Often these have a research station attached to them. In addition there are separate research institutes both for growing vines and wine making at Anapa in the Caucasus, Krasnodar in Kuban, Konkordia in Azerbaidjan, Odessa, Hotin in Bessarabia, Prinknusk in Crimea, and Akkawee in Turkestan.

915. DEARING, C. 634.848
Muscadine grapes [*Vitis rotundifolia* and *V. munsoniana*].
Fmrs' Bull. U.S. Dep. Agric. 1785, revised 1947, pp. 29, illus., 10 cents.

A revised edition of a bulletin first issued in 1938. Muscadine grapes, which are native to the south-eastern part of the U.S.A., are suitable for home gardens or commercial growers. They are relatively uninjured by diseases and insects, produce well with a minimum of attention but cannot be grown where temperatures of 0° F. commonly occur. A general description of these grapes is followed by notes on propagation, soils, planting, manuring, pollination, training, harvesting, yields, pests, diseases and varieties. [See also H.A., 8: 425.]

916. LEYVRAZ, H. 634.836.62
Sélection du Chasselas. (Selection of the Chasselas grape vine.)
Rev. romande Agric. Vitic., 1947, 3: 84-7, being *Publ. Stat. féd. Ess. vitic. arboric. Lausanne* 359, 1947, pp. 14, bibl. 2.

An account of twenty-five years' selection of Chasselas type grape vine. Three clones were chosen for propagation, and over eight years some individuals produced twice as much fruit as did the unselected types. Their superiority was marked in years when heavy fruit fall occurred. The grower can increase the productivity of his vineyard by replacing indifferent vines by the better planting material obtainable from nurserymen.

917. BIRON, M. 634.8
"Clairette" en Turquie. (The Clairette vine in Turkey.)
Progr. agric. vitic., 1948, 129: 198-201, bibl. 5.

* A second report was promised in the near future bringing the subject up to date.

The Clairette grape variety grown in Thrace is the white or true Clairette. It is here described and illustrated.

918. BRUNI, B. 634.8: 581.46
Il fiore della vite quale elemento differenziale.
(The use of differences in vine flower morphology.)
Ital. agric., 1947, 84: 458-60.

In *Vitis vinifera* three distinct types of flower can be seen:— (1) male or stamen-bearing flowers, in which the pistil is absent or abortive and the stamens have long erect filaments. (2) Perfect hermaphrodite flowers in which the filaments are fairly long, erect and spread out, with anthers at about the same height. (3) (Wrongly named) female flowers, in which the filaments curve backwards or round, the anther being some distance below. The author shows how advantage has been taken of this phenomenon by breeders and suggests that even more notice could be taken of it with advantage.

919. DE BOIXO, BARON. 634.8
Mesures d'accroissement du volume des raisins, effectuées entre le 18 Juin et le 20 Septembre 1947.
(Measuring the increase in volume of grapes between 18 June and 29 September, 1947.)
Progr. agric. vitic., 1948, 129: 137-40.

The increase in volume was calculated from the diameters measured with a sliding caliper.

920. CAPUCCI, C. 634.8-1.53
Osservazioni sull'allevamento dei barbatelloni di vite in vivaio. (Practical methods of raising rooted vine cuttings. [French and English summaries.]
Riv. Frutticoltura, 1947, 9: 42-88.

Among recommendations made by the author as the result of 7 years' trials and observations are the following:—Use ground not previously under vines; have a wide space between rows; support the stem of each plant. Other important points are that the plants should be grown in double rows inclined at an angle of 45° within the rows towards each other; that shoots should be partially defoliated; nitrogenous manuring and irrigation should take place a few days before grafting; cleft grafting with hardwood scions should take the place of softwood splice or whip and tongue grafting when grafting material is scarce or rubber bands for keeping the grafts in position are unobtainable. The grafts are inserted at a height of 150-180 cm. from the ground.

921. CAPUCCI, C. 634.8-1.53
Criteri da seguirsi nella preparazione dei barbatelloni di vite selvatici ed innestati. (Further hints on raising rooted vine cuttings.)
Riv. Frutticoltura, 1948, 10: 1-9, bibl. 3.

Further details of green cropping between the double rows, manuring, keeping the soil from getting too compact, pruning, etc., are discussed.

922. FUSIGNANI, J. 634.8-1.535
Prove sperimentali sul radicamento delle talee di vitigni portinnesti americani. (Aids to rooting American vine cuttings.)
Riv. Frutticoltura, 1947, 9: 23-32, bibl. 18.

Immersion for 4, 24 or 48 hours of Berlandieri × Riparia 420A and Riparia × Rupestris 101-14 cuttings in cow urine at strengths of 1 urine : 2 water, 1 : 1 and 2 : 1 resulted in better root formation. Whether the cow was pregnant or not made no difference. Further trials should establish optimum length of immersion period and strength of solution.

923. HOUDAYER, C. 634.8-1.535: 577.17
Les hormones de bouturage en viticulture. (The use of growth substances for vine cuttings.)
Progr. agric. vitic., 1948, 129: 184-8.

Encouraging results are reported but without detail of procedure.

924. STAEHELIN, M., AND WURGLER, W. 634.8-2.19
 Quelques cas de rabougrissement de la vigne.
 (Certain cases of dwarfing in the vine.)
Rev. romande Agric. Vitic., 1947, 3: 11-14, being
Publ. Stat. féd. Ess. vitic. arboric. Lausanne 353,
 1947, pp. 8.

Dwarfing in the vine may be due to a faulty graft union caused by the use of unripe wood, and followed by the development of tyloses and gum which block the vessels. Other causes are incomplete callusing at the base of the rootstock, and wound damage. These are due to errors in technique, and can be avoided.

925. MARINUCCI, M. 634.8 + 634.63
 La vite e l'olivo. (Mixed plantations of vines and olives.)
Ital. agric., 1947, 84: 295-7.

A plea for the planting of vines and olives together where climatic conditions allow. The olives are not used as supports. They should come into production in 30 to 40 years when the vines are beyond their prime. Cultivation and manuring should suit both species.

Nuts.

926. SCHUSTER, C. E. 634.5
 Edible nuts of the Pacific Northwest.
Econ. Bot., 1947, 1: 389-93.

The nuts described are the indigenous hazel *Corylus californica*, evergreen chinquapin *Castanopsis chrysophylla* and two species of oak *Quercus garryana* and *Q. kelloggii*. Walnuts and filberts were introduced by the early settlers. Walnut varieties grafted on seedlings of *Juglans hindsii* often die, following the formation of corky tissue at the graft union 15 to 30 years after planting.

PLANT PROTECTION OF DECIDUOUS FRUITS.*

General.

929. MOORE, W. C. 632.1/9: 633/635(42)
 Diseases of crop plants [in England and Wales]
 1943-1946.
Bull. Minist. Agric. Lond. 139, 1948, 90 pp.,
 2s. 6d.

This bulletin is drawn up on the lines of a previous report (*H.A.*, 14: 1106). It begins with a map of advisory centres and provinces, their advisory mycologists, and a list of collaborators. This is followed by a map of the eight provinces of the new National Agricultural Advisory Service showing provincial centres and sub-centres, with the names of the senior advisory plant pathologists at those centres. Brief notes are given on the weather for the four years under review, and there is a list of records of special interest. The rest of the bulletin consists of notes on diseases of crop plants based on reports sent in to the Ministry's Plant Pathological Laboratory at Harpenden, during the four years. The crops are grouped under cereals, potatoes, roots and fodder crops, pulses, pasture and forage crops, vegetables, fruit, hop, mushroom and flax, ornamental and miscellaneous plants. Reference is made to relevant and important articles published on the diseases during the period. There are 26 excellent photographs, and 5 maps showing the distribution (in December, 1946) of asparagus rust, onion smut, tomato bacterial canker, red core of strawberry, and grey bulb rot of tulip, indicating isolated outbreaks and substantial areas infected.

930. BUNDESANSTALT FÜR PFLANZENSCHUTZ, WIEN. 632.1/9: 633/635(436)
Flugblätter. (Leaflets.)
 Vienna II, Trunnerstrasse 1, 1945-1948, 20 gross-
 chen each.

Attention is drawn to the advisory leaflets of 2 to 4 pages,
 * See also 911, 1078-1083, 1509, 1517, 1521.

927. CARRANTE, V. 634.55-1.8
 Un triennio di esperienze di concimazione al
 mandorlo. (Three years almond manurial trials,
 1940-42.)
 Reprinted from *Risveglio agric.*, 1947, Nos. 3-4,
 15 pp.

Numerous data produced in trials carried out in Apulia and in Sicily with named varieties of almond are tabulated and certain general conclusions are reached, among them the following:—The effects of manuring such plants as the almond under dry farming conditions are often masked by seasonal or genetic factors. It is possible to increase production by applying mineral fertilizers. An adult tree under the conditions of the experiments needs a complete fertilizer composed of 600 g. P_2O_5 , 400 g. K_2O and 200 g. ammoniacal nitrogen applied in autumn before the rains. Nitrogen is preferable in this form to the nitrate. The omission of any one of these elements, especially K or P, results in reduced yield.

Noted.

928.
 a LEYVRAZ, H. 634.8: 631.541.11
 Production indigène de bois porte-greffes. (Pro-
 duction of vine rootstock material in Switzerland.)
Rev. romande Agric. Vitic., 1947, 3: 45-7, being
Publ. Stat. féd. Ess. vitic. arboric. Lausanne 356,
 1947, pp. 8.
 b ROBINSON, W. B., AND OTHERS. 634.75: 664.85.75.037
 Chemical composition and freezing adaptability
 of strawberries.
Bull. N. York St. agric. Exp. Stat. 726, 1947,
 pp. 14, bibl. 17.

produced by the Austrian Phytopathological Service since the end of the war, on all the various pests and diseases of agricultural and horticultural crops of Austria. The latest received by the Bureau is No. 42 on aphids.

931. VAN KOOT, Y. 631.544: 634.2-2.1/8
 Verschillende oorzaken van afsterving van
 perzik en pruimen onder glas. (Various causes
 of the death of peach and plum trees in glasshouses.)
 [English summary $\frac{1}{2}$ p.]
Meded. Direct. Tuinb., 1947, 10: 618-34, bibl. 9,
 illus.

Short descriptions are given of (1) root damage due to unfavourable soil conditions, (2) root rot fungi (*Armillaria mellea* and *Pholiota squarrosa*), (3) damage by water voles, (4) stem infection by *Verticillium dahliae*, (5) bacterial canker (*Pseudomonas mors-prunorum* and *P. prunicola*), (6) water canker (*Clasterosporium carpophyllum*), (7) silver leaf (*Stereum purpureum*), (8) frost damage, (9) damage caused by petrol-emulsion and dinitro-orthocresol.

Deficiencies and excesses.*

932. MULDER, D. 634.1/7-2.1
 Overmaat en tekort aan voedingsstoffen als
 oorzaken van ziektenverschijnselen bij vrucht-
 bomen. (Excess and deficiency diseases in fruit
 trees.)
Tuinbouw, 1947, 2: 305-9.

A general account of the symptoms and causes of the disorders in apple and pear trees induced by excess or deficiency of nutrient elements, with two pages of coloured illustrations showing the symptoms resulting from deficiencies in iron, manganese, potassium, and magnesium.

* See also 825.

933. FORESTER, E. D. 634.11-2.19: 546.47
Zinc deficiency in New Zealand apple trees.
Orchard. N.Z., 1947, 20: 4: 4-5.
Granny Smith apple trees showing poor growth and small leaves were restored to health by spraying during the dormant season with 25 lb. of zinc sulphate per 100 gal. of water.
934. REYNOLDS, E. 634.11-2.19: 546.47
Deficiency of zinc in New Zealand apple trees.
Orchard. N.Z., 1947, 20: 8: 12-14.
The symptoms of zinc deficiency in apple trees are described and illustrated. There are various forms of treatment such as the application of zinc sulphate to holes in the trunk or to the soil, driving zinc-coated iron or nails into the trunk, or spraying a solution on the trees. The author experimented with spraying, using 50 lb. of zinc sulphate to 100 gal. water in early August before bud movement. The most startling results were shown on the Gravenstein variety, the foliage on the treated trees being generally double the size of that on the untreated trees.
935. WIEBOSCH, W. A. 632.191: 634/635
Het optreden van chlorotische verschijnselen in Noord-Holland benevens het opsporen en opheffen daarvan. (Chlorosis in North Holland: its identification and control.) [English summary $\frac{1}{2}$ p.]
Meded. Direct. Tuinb., 1947, 10: 556-65.
In certain horticultural holdings of North Holland vegetable and fruit crops suffer from lime-induced chlorosis, mainly due to shortage of iron and manganese. Distinction is drawn between mineral hunger (when the elements are present but unavailable) and mineral deficiency. The soils are all more or less naturally calcareous; formerly they were liberally supplied with organic manures, but since artificial fertilizers have largely replaced organic manures chlorosis has become noticeable. The diagnostic methods elaborated at the East Malling and Long Ashton research stations in England are discussed in relation to their adoption in Holland.
936. SCOTT, L. E., AND SCHRADER, A. L. 634.8-1.811.9: 546.27
Effect of alternating conditions of boron nutrition upon growth and boron content of grape vines in sand culture.
Plant Physiol., 1947, 22: 526-37, bibl. 15, being *Sci. Pap. Md agric. Exp. Stat.* A176.
Two-year-old vines of Catawba, Herbert, Golden Muscat and Lindley varieties were grown in sand in the greenhouse. When boron was withheld, deficiency symptoms were shown by meristematic leaves within 30 days of the beginning of growth. Normal growth was resumed within 10 days of adding boron to the culture solution. In deficient plants the concentration of boron was 20 to 25 p.p.m. in all parts; in healthy leaves the concentration ranged from 57 to 146 p.p.m. *Deficiency symptoms*.—The early symptoms are a diffuse chlorosis of the younger leaves; brownish, water-soaked areas in the apical tendrils; and cupping of the third or fourth leaf from the tip. Necrotic areas develop later. The apical internodes are shorter and more brittle than those of normal vines. Young leaves may be malformed and deeply lobed.
937. MILLER, V. L., JOHNSON, F., AND ALLMENDINGER, D. F. 634.22-2.19: 546.16
Fluorine analysis of Italian prune foliage affected by marginal scorch.
Phytopathology, 1948, 38: 30-7, bibl. 30.
A new non-parasitic disease of Italian prune trees, characterized by marginal scorch and leaf spot, appeared in certain areas of western Washington in the neighbourhood of aluminium factories. Chemical analysis showed that leaves from trees in the affected areas were abnormally high in fluorine, and this is presumed to be the cause of the scorching.
938. MANARESI, A., AND MALUCELLI, R. 634.23-2.112
A proposito della così dette "Moria" del ciliegio nel Cesenate. (The so-called "Moria" of cherries in the neighbourhood of Cesena.) [English summary.]
Riv. Frutticoltura, 1947, 9: 4-22, bibl. 11.
Cherries are cultivated on a large scale around Cesena in S.E. Emilia. Many trees have in recent years, especially after very dry seasons, gone into a decline, have subsequently ceased bearing and died. Soil analyses show that the lime content in the district varies from 6 to 13.5% in the soil and from 7.5 to 13.5% in the subsoil. Where the trees continue to flourish, the clay and sand contents vary from 21 to 60% and 40 to 79% respectively in the soil and from 19 to 63% and 37 to 81% in the subsoil. But where a decline has set in, the figures are respectively 82 to 97% and 3 to 18% in soil and 83 to 95% and 5 to 17% in subsoil. These figures offer a clue to the incidence of Moria.
939. CAMPBELL, L. 634.75-2.19
Strawberry dud.
Abstr. in *Phytopathology*, 1948, 38: 4.
The symptoms of strawberry dud are a lack of new roots, increased red discoloration and reduced vigour of the tops, wilting and death after transplanting. The disease is most frequent on light soils deficient in nutrients. Late digging, delayed planting and poor or prolonged storage aggravate the trouble.
940. ANON. 631.415.36
Le dessalement des terres de culture inondées par la mer. (Removing the salt from cultivated areas which had been inundated by the sea.)
Progr. agric. vitic., 1948, 129: 143-6.
An account of measures for restoring to productivity Dutch soils inundated with seawater during the war. After rains had removed the excess of salt the consistency of the soil was improved by the application of gypsum.

Climatic factors.

941. BUSH, R. 551.51: 634/635
Weather forecasts for the individual grower.
Grower, 1948, 29: 206-9.
A popular account of a new commercial service in Britain which undertakes to provide horticulturists with warnings of frosts or high winds and to advise on suitable weather for spraying or harvesting operations. Other types of forecast are also offered.
942. CAMERON, L. G. 551.51: 63
Agricultural Meteorology Section of the Climatological Branch [of the Meteorological Office].
Met. Mag., 1948, 77: 12-14.
The formation of this section is outlined and some of its problems indicated. In addition to the Headquarters staff at Harrow, Middlesex, meteorological officers have been posted to the School of Agriculture, Cambridge, and to the National Agricultural Advisory Service at Bristol.
943. PALMER, R. G. 551.51: 632.95
Radio and the expert combine to beat the weather.
Amer. Fruit Gr., 1948, 68: 3: 20-1.
The author describes his broadcasts to fruitgrowers in parts of New York State. These are made each morning during the spraying season and give the weather forecast with appropriate recommendations for the control of pests and diseases; the weather is taken into account as it affects both the activity of pests and diseases and the possibility of spraying or dusting. This service facilitates the simultaneous application of control measures in isolated orchards.
944. SCHAEFER, V. J. 551.51
The story of man-made weather.
Amer. Fruit Gr., 1948, 68: 3: 17, 40, 42-3.
A review of experiments to modify clouds. Although

solid and liquid CO₂, silver iodide, water and ice have been used to stimulate the formation of rain or snow, no general control of the weather appears to be possible.

945. HANSEN, N. E. 632.111: 634.11 + 635.937.34
Breeding of extra-hardy plants for cold climates.
Plants and Gardens, 1948, 4: 9-13.

A popular account of the author's work on crab apples and roses.

946. HILKENBÄUMER, F. 634.1/2-1.541.11: 631.23
Resistenzüchtung bei Obstunterlagen. (Breeding for resistance in fruit tree rootstocks.)
Kühn Arch., 1943/44, 60: 455-61, bibl. 2 [received 1948].

Resistance to frost, diseases and pests is considered in this brief discussion.

947. ANON. 632.111: 634.1/8
Research station to combat frosts of central Otago.
Orchard, N.Z., 1947, 20: 7: 12-13.

A fully equipped research station has been established alongside the research orchard at Earnsclough near Alexandra, Central Otago, for the investigation of various aspects of the frost problem as it affects orchards. Photographs illustrate different sections of the Station.

948. PROBINE, M. C. 632.111
New Zealand scientists are working on frost problems.
Orchard, N.Z., 1947, 20: 8: 16-18.

The Department of Scientific and Industrial Research in co-operation with the Meteorological Branch, Air Department, is conducting an investigation into various aspects of the frost problem. The Meteorological Office is collecting data with the object of giving a more exact frost forecast. The D.S.I.R. is undertaking the following problems: (a) Finding damaging frost temperatures for different types and varieties of fruit at each stage of growth. (b) Investigating the effectiveness of methods of protection most suited to the New Zealand problem. (c) Developing instruments as may become necessary, e.g. frost alarms. (d) Accurate recording of inversion ceilings and air drifts on frost nights. (e) Developing more efficient and reliable equipment for orchard heating.

949. TIDMARSH, C. 632.111
Science aids orchardists in battle with frost.
Fruit and Produce, 1947, 2: 9: 18-20, from *Auckland Star*.

A popular account of experiments with horizontal fans, organized by the Department of Scientific and Industrial Research of New Zealand. The fan is electrically driven, so that automatic operation is possible.

950. PARKER, J. H. 632.111: 634.1/7
How Californians fight frost.
Orchard, N.Z., 1947, 20: 1/2: 10-12.

A discussion of methods which are being tried for the prevention of frost damage in Californian orchards.

951. WURGLER, W. 634.8-2.111: 577.17
Peut-on employer des phytohormones pour retarder le débourrement de la vigne? (Can growth substances be used to delay the opening of vine buds?)
Rev. romande Agric. Vitic., 1948, 4: 11-13, bibl. 5.

Applied just before bud burst, growth substances do not delay opening long enough to afford protection against late frosts; 2,4-D, moreover, causes injury. Strong lime-sulphur is being used successfully.

952. FUCHS, W. H., AND HILKENBÄUMER, F. 634.1/7-2.111
Zur Methodik der Frostschadenfeststellung an Obstgehölsen. (The evaluation of frost injury in fruit trees.)
Kühn Arch., 1940, 54: 259-66, bibl. 11 [received 1948].

The following types of frost damage are discussed: (1) Apparent injuries (a) in leaf and flower buds, (b) in young shoots, (c) in the trunk and limbs; (2) internal (concealed) injuries (a) in the young wood, (b) in the old wood, (c) in the above-ground part of the rootstock, (d) in the roots of the rootstock; (3) delayed flowering and delayed foliation.

953. HILKENBÄUMER, F. 634.1/2-1.541.11: 632.111
Einfluss von Unterlage und Standort auf den Frostschaden an Kernobst im Winter 1939/40 in der Baumschule. (The influence of rootstock and locality on the frost damage sustained by pome fruits in the nursery during the winter of 1939/40.)
Kühn Arch., 1942, 56: 1-24, bibl. 5 [received 1948].

The observations recorded covered three different regions in northern and central Germany, and a large number of subjects. Some of the author's chief conclusions are as follows:—(1) In apple trees the damage took the form of frost plates [Frostplatten], whereas in pears usually the entire bark was injured. Apple rootstocks did not suffer. (2) Maiden trees were less heavily injured than two- or three-year-old trees of identical combination. (3) Frost susceptible varieties suffered severely on E.M. XVI, but formation of frost plates was insignificant on E.M. IX and IV. The least damage was sustained on E.M. I, II, V and XI. (4) In two regions quince A proved much superior to pear seedlings as regards frost resistance. (5) With more or less susceptible varieties and in not too unfavourable localities the rootstock, and not the locality, determines the extent of the frost damage.

954. MADER, E. O., AND FELDMAN, A. W. 634.75-2.111
Physiological exhaustion of strawberry plants as a factor in winter killing.
Phytopathology, 1948, 38: 137-41, bibl. 6.

Experiments recorded indicate that strawberry plants subjected to alternating freezing and thawing undergo a physiological weakening or exhaustion leading to ultimate death. Soil inhabiting plant pathogens are not necessary to cause the death of such plants, but they may be a contributory factor. Maintaining the carbohydrate reserve in the strawberry plants will probably reduce losses due to winter killing.—University Farm, St. Paul, Minnesota.

955. ANON. 634.1/3-2.183
Orchard windbreaks.
Qd agric. J., 1947, 65: 395.

Trees for use as orchard windbreaks must grow rapidly to such a size and density as to slow down strong winds; they should not harbour pests of fruit trees. Two rows of staggered trees are advisable, spaced 10 to 15 ft. between the rows with trees 20 ft. apart in the rows. Competition for soil moisture can be reduced by an open drain between windbreak and orchard. Apart from the reduced loss due to windfalls, fruit trees grow better when sheltered from strong winds.

956. SUTHERLAND, M. 632.183
Rapid shelter for minor species of trees.
N.Z. J. Agric., 1947, 75: 387-93, illus.

There are ways of obtaining good shelter from storms around the house or on the farm without waiting for the growth of tall trees, and some smaller, quick-growing kinds useful as windbreaks are described. These include New Zealand flax (*Phormium tenax*), ngaio (*Myoporum*

laetum), pampas grass (*Cortaderia selloana*), the small-leaved bamboo (*Arundinaria macrosperma*), and tree lucerne (*Cytisus proliferus*).

957. VAN DE POL, P. H. 632.112: 634.1/2
Verschijnenselen bij diverse tuinbouwgewassen, die in verband staan met de droge en warme zomer. (Drought symptoms in horticultural crops.)
Tijdschr. PLZiekt., 1947, 53: 187-9.

The effect on various crops of drought, heat, sudden rain after drought, and wide temperature variations in the summer of 1947 is described. Among other observations it was noticed that the blossoming period of pome and of stone fruit trees was very short, lasting only for about 5 days, during which the weather was very fine, and there was an abundant set of fruit. A wet followed by a warm period in June resulted in a severe outbreak of scab.

Viruses.

958. SMITH, K. M. 632.8
Twenty years of plant virus research.
Mem. Sch. Agric. Camb. 19, 1948, pp. 7-10, bibl. 19.

The author reviews the main advances in the study of plant viruses during the last 20 years and indicates the outstanding steps.

959. BLODGETT, E. C., AND OTHERS. 634.23-2.8
The occurrence and transmission of little cherry in Washington.
Abstr. in *Phytopathology*, 1948, 38: 2-3.

The disease has been transmitted by bud inoculation, and in one case by root inoculation. Control is being attempted by voluntary removal measures.

960. PALMITER, D. H., AND PARKER, K. G. 634.23-2.8
Peach X-disease on sour cherry.
Abstr. in *Phytopathology*, 1948, 38: 20.

On the English Morello and Montmorency varieties of *Prunus cerasus*.

961. COCHRAN, L. C., AND STOUT, G. L. 632.8: 634.2 + 634.55
Studies on the natural spread of the peach-mosaic virus among apricots, almonds and peaches.
Abstr. in *Phytopathology*, 1947, 37: 843.

If the few cases of mosaic occurring in peach planted near mosaic-affected apricots and in almonds represent natural spread from these hosts, the rate is extremely slow in contrast to spread from peach to peach.

962. HEWITT, W. B. 634.8-2.8
The development of Pierce's disease and its occurrence in rogued and non-rogued vineyard plots.
Abstr. in *Phytopathology*, 1947, 37: 844.

Pierce's disease (see *H.A.*, 16: 1362, 1894) in a vineyard or district occurs in three general patterns: (1) irregularly scattered over most of the area, (2) centred in small localized areas, and (3) concentrated in portions of vineyards adjacent to alfalfa or irrigated pastures. The systematic removal of diseased vines twice each season, once in spring and again in autumn, in vineyard plots, did not significantly influence the occurrence of new cases of disease in comparison with similar vineyards that were not so rogued.

963. ESAU, K. 634.8-2.8
Anatomical effects of the Pierce's-disease virus.
Abstr. in *Amer. J. Bot.*, 1947, 34: 583.

Pathological changes occur in the xylem of alfalfa and vine when infected with this virus. Gum is formed in the vessels, and in the vine tyloses also develop.—University of California, Davis.

964. GALLAY, R. 634.8-2.8
La dégénérescence infectieuse de la vigne. (Infectious degeneration of the vine.)
Rev. romande Agric. Vitic., 1947, 3: 59-61, 66-7, bibl. 1.

In describing the symptoms of infectious degeneration [court-noué] of the vine the writer points out that some may be produced artificially, e.g. by faulty manuring. Although the vineyards of Switzerland do not appear to be threatened by this disease, certain precautions should be taken when importing bud-wood from France.

Bacteria.

965. MORWOOD, R. B. 634.22-2.3
Experiment on the control of bacterial spot of plums.
Qd agric. J., 1947, 65: 239-42.

The following spraying programme has been recommended for plum varieties susceptible to bacterial spot, *Xanthomonas pruni*: (a) at bud movement, bordeaux mixture, 6-4-40, (b) seven to ten days later, ditto, (c) just prior to full blossom (about three weeks after the first application), bordeaux mixture, 3-2-40.

966. MILLER, P. W., AND BOLLEN, W. B. 634.51: 632.3

Walnut bacteriosis and its control.

Stat. tech. Bull. Ore. agric. Exp. Stat. 9, 1946, 107 pp., bibl. 122.

Our present knowledge of walnut bacteriosis, its cause (*Xanthomonas juglandis*), distribution, symptoms, and relation to meteorological conditions, is reviewed, supplemented with the authors' observations. From control measures recorded in considerable detail it is concluded that under epidemic conditions dusts are not generally so effective as bordeaux mixture, though some of them gave good control under moderate disease conditions. Of the dusts tested, a copper+lime+sulphur+oil (20-40-10-2) dust and a yellow cuprous oxide+sulphur (8-15) dust gave the best control.

967. MILLER, P. W., AND SCHUSTER, C. E. 634.54-2.1/4
Filbert tree decline and loss. Causes and control.
Stat. Circ. Ore. agric. Exp. Stat. 172, 1947, 19 pp.

The diseases and disorders contributing to loss in filbert orchards in the Pacific Northwest are bacterial blight (*Xanthomonas corylina*), mushroom root rot (*Armillaria mellea*), wood rots caused by various wood-rotting fungi, and disorders due to malnutrition or adverse environmental factors. Measures for the control of bacterial blight and the fungus diseases are outlined.

968. HAMPTON, J. E. 632.314
Cure of crown gall with antibiotics.
Abstr. in *Phytopathology*, 1948, 38: 11.

Streptomycin is rather more efficient than penicillin. but more than one treatment with either has seldom been necessary. Host plants included pear, plum, cherry and tomato.

Fungi.

969. SHAY, J. R., AND HOUGH, L. F. 634.11-2.42
Resistance to apple scab in certain clones of *Malus* species.
Abstr. in *Phytopathology*, 1948, 38: 23.

Twenty-two clones of *Malus* in plots at Urbana, Illinois, and in Morton Arboretum, Lisle, Ill., have remained free from foliage and fruit infection by *Venturia inaequalis* during the past three years in which apple scab has been epiphytotic.

970. KNOPPIEN, P., AND VLASVELD, W. P. N.

632.42: 634.11 + 634.13

Vier jaren voortgezet onderzoek over de schurft van appel en peer. (Four years research on apple and pear scabs.) [English summary 1½ pp.] *Tijdschr. Plziekt.*, 1947, 53: 145-80, bibl. 13.

The great difficulty of foretelling ascospore discharge from temperature summation or other meteorological observations is stressed. Factors affecting the maturation of the perithecia in the spring are discussed. Spraying the leaves in late autumn or after they have fallen, to prevent development of perithecia is only effective if done thoroughly; it is, moreover, costly.

971. FITZGIBBON, M.

632.42: 634.11

+ 634.13

Phenyl mercuric chloride—its development for apple and pear scab control.

Fruitgrower, 1948, 105: 141-2.

Extensive use of preparations containing phenyl mercuric chloride shows that it is as effective as lime-sulphur or bordeaux for the control of scab on apples and pears. Concentrations between 0.005 and 0.01% are recommended. Foliage damage has rarely been reported.

972. STADHOUDERS, P. J.

634.11-2.42

Proef ter bestrijding van schurftziekte bij appels. (Apple scab control tested.)

Meded. Direct. Tuinb., 1946, 9: 5-9 [received 1948].

A trial is described in which the effect of "reservoir" spraying is investigated. This method implies the very early application (before the buds swell) of a copper fungicide at high concentration. The resulting deposit serves as a store of copper, which is gradually dispersed by rain and dew and so protects the developing organs as the buds open, over a comparatively long period. It was found that a "reservoir" spray of 6% bordeaux mixture was much better than not spraying at all before blossoming, and in 1944 was as good as any other pre-blossom spraying. A "reservoir" spray of 3% bordeaux also gave good results.

973. DE SONNAVILLE, P.

632.42: 634.11

Calciumarsenaat als bestrijdingsmiddel tegen schurft. (Arsenate of lime for the control of scab.)

Meded. Direct. Tuinb., 1947, 10: 427-9.

The author concludes from the experiments described that calcium arsenate has a distinct fungicidal action, when used as a protective spray, against apple scab.

974. GUBA, E. F.

634.11-2.42

Eradicating apple foliage scab with summer sprays.

Abstr. in Phytopathology, 1947, 37: 848.

Apple trees (19-year-old McIntosh) were sprayed at 450 lb. pressure and 15-16 gal. per tree. Liquid lime-sulphur (1-50) gave fair results. Two to three applications almost eradicate scab, but the treatments cause some injury to fruit and foliage. Puratized Agricultural Spray (phenylmercuri triethanol ammonium chloride) (½ pint-50 gal. water) operates to kill the incubating and sporulating scab fungus and to stop infection completely without any apparent injury to the foliage.

975. DARPOUX, H., AND VUITTENEZ, A.

632.42: 634.13

Essais de traitements en cours de végétation contre la tavelure du poirier. (The control of pear scab during the growing season.)

C.R. Acad. Agric. Fr., 1948, 34: 126-31.

The authors compare certain new fungicides with well-known ones in trials against pear scab (*Venturia pyrina*). They found that the copper products resulted in excellent crops. Bordeaux mixture gave the most constant favourable result, with copper oxychloride slightly inferior. Micronized

wettable sulphur (1%) was almost as good as lime-sulphur. 2-heptadecylgloxalidine and phenylmercuri triethanolammonium lactate were less effective. Neutral orthoxyquinolene sulphate is active when applied just before infection occurs, but its effective duration is short.

976. COLE, J. R.

634.521-2.42

A comparison of home-made bordeaux-mixture with other fungicides for control of scab on the Schley and Moore varieties of pecan.

Phytopathology, 1948, 38: 106-9.

Generally speaking bordeaux + a spreader-sticker gave the best control of pecan scab.—U.S. Pecan Field Station, Albany, Ore.

977. CROWDY, S. H.

634.11-2.42: 577.17

Treatment of apple canker lesions with plant-growth substances.

Nature, 1948, 161: 320-1.

Cankers, caused by *Nectria galligena*, showed a marked improvement over controls when treated with 1% β -indolebutyric acid in lanoline. Various growth substances somewhat retarded the growth rate of the fungus in culture.—Long Ashton Research Station.

978. D'ESTIVAUX, L. B.

634.8-2.952

Le cuprosulfite de cuivre, anticryptogamique permanent pour la vigne. (Copper cuprosulphite as a fungicide for use on vines.)

C.R. Acad. Agric. Fr., 1948, 34: 37-40.

Copper cuprosulphite is recommended as a control for both vine mildew and oidium. In early field trials results were inconclusive because of the scarcity of infection, but in 1946 they were promising.

979. THOMAS, H. E., AND OTHERS.

634.1/2-1.541.11-2.4

Rootstock susceptibility to *Armillaria mellea*.

Phytopathology, 1948, 38: 152-4.

In attempts to select plum rootstocks resistant to *Armillaria mellea* trees of several varieties were planted and inoculated with the fungus. Only two trees proved sufficiently resistant for propagation for further trials. Of other types of fruit examined fig was least affected and the best persimmon hardly more so. The best apples, in rating for disease, approached the pear, which is seldom, if ever, killed by this fungus in orchards. The French pear (*Pyrus communis*) was definitely more resistant than the quince.—University of California, Berkeley and San Jose.

980. COOLEY, J. S.

634.11-2.4

Natural infection of replanted apple trees by white root rot fungus.

Phytopathology, 1948, 38: 110-3, bibl. 2.

In replanting experiments in two Virginian apple orchards, in which *Corticium galactinum* white root rot prevailed, over one-half of the replants in infested soils became infected. The general deduction is made that the presence in the soil of woody material is necessary for the start and maintenance of the pathogen as well as for subsequent infection of apple trees.—Plant Industry Station, Beltsville, Maryland.

981. RUGGERI, G.

634.55-2.4

Osservazioni sopra una nuova malattia dei frutti di mandorlo. (Observations on a new disease of almond nuts.)

Reprinted from *Nuovo G. bot. ital.*, n.s., 1947, 54, 6 pp.

A disease of almond nuts from Sicily is described. The kernels instead of being white and plump are thin and grey or greyish brown. A species of *Hyalodendron* isolated from infected tissues was found to be highly pathogenic under moist conditions. On dry nuts in store the disease is absent or does not develop further. It is thought that the disease starts when the almonds are still on the tree.

Mites and insects.

982. KUENEN, D. J. 632.654.2: 634.1/2
Het fruitspint en zijn bestrijding. (The fruit tree red spider and its control.) [English summary 2 pp.]
Meded. TuinbVoorlichtDienst 44, 1946, 68 pp., illus.
The fruit tree red spider (*Metatetranychus ulmi* Koch) and its control are discussed under the following headings: (1) Introduction. (2) Life-cycle and damage caused. (3) Variation in the number of mites on the trees. (4) Influence of climate. (5) Influence of variety and rootstock. (6) Influence of food. (7) Predators. (8) Effect of sprays. (9) Red spider in the well-kept and the neglected orchard. (10) Control. Summer oil is stated to be the best spray for its control, for it kills all mites and nearly all the eggs when carefully applied.
983. AUBANEL, G. 634.13-2.752
Remarques sur la biologie de la cochenille ronde du poirier (*Diaspis leperii* Sign.) au cours de l'année 1947. (The biology of the pear scale *Diaspis leperii*.)
C.R. Acad. Agric. Fr., 1948, 34: 94-5, bibl. 3.
Observations in 1947 confirm the fact that *Diaspis leperii* has only one annual generation. It hibernates as a fertilized immature female, a form which appears to be rather resistant to the action of insecticides unless applied carefully. A predator mite and a hymenopterous parasite appear to check its proliferation.
984. (MINISTRY OF AGRICULTURE.) 632.753: 634.72
Currant and gooseberry aphides.
Adv. Leaf. Minist. Agric. Lond. 176, 1948, pp. 4.
Descriptions of *Amphorophora sonchi*, *Aphis grossulariae*, *Capitophorus ribis*, *Myzus laticuae* and *Eriosoma ulmi* and methods of control with tar oil, DNC washes or nicotine wash.
985. WASON, E. J. 634.25-2.753
The black peach aphid (*Anuraphis persicae-niger*) in the Murrumbidgee Irrigation Area.
Agric. Gaz. N.S.W., 1947, 58: 525-9, bibl. 3.
The suggested spray treatment includes a dormant spray (DNC or tar distillate) applied late in July (for New South Wales) and a 0.1% DDT spray at the late bud-swell stage (late August). The applications must be at high pressure, at least 250-300 lb. per sq. inch.
986. FENTON, F. A., AND BRETT, C. H. 634.25-2.754
Cause and prevention of catfacing, a peach-fruit malformation.
Proc. Okla Acad. Sci., 1947, 27: 34-7, bibl. 2.
The condition is mainly caused by the tarnished plant bug *Lygus oblineatus*. Tables are given showing (1) the effect of DDT sprays in reducing catfacing, (2) the comparative effectiveness of 4 concentrations of 50% water-miscible DDT, and (3) the number of nymphs collected on 4 host plants between April and October.—Oklahoma Agric. Exp. Stat., Stillwater.
987. ANON. 632.754: 634/635
The Rutherglen bug (*Nysius vinitor*).
Agric. Gaz. N.S.W., 1947, 58: 595-6, 599.
This pest is described and illustrated. It may be controlled on vegetable crops by DDT 0.1% spray or a kerosene-pyrethrum emulsion. For fruit trees DDT 0.1% sprays have proved generally satisfactory and are likely to become the standard recommendation for control. As the bugs breed among various weeds, clean cultivation or attention to turning the weeds in at an appropriate time may prevent the building up of a serious infestation.
988. MICHELIS, E. 634.11-2.754
La cicadelle du rosier (*Typhlociba rosea* L.) ravageur des pommiers. (The rose leafhopper attacking apples.)
Fruit belge, 1947, 15: 16-20, bibl. 7.
The rose leafhopper is reported as attacking apple leaves in Belgium. Its control is easily effected by the application of a contact insecticide during the larval and nymphal stages.
989. STADHOUDERS, P. J. 634.11-2.76
Proef ter bestrijding van den appelbloesem-snuutkever (*Anthonomus pomorum* L.). (A trial for the control of apple blossom weevil.)
Meded. Direct. Tuinb., 1946, 9: 97-9 [received 1948].
From the results of his experiment the author's advice is: Spray with 1% Gesarol, the first time as the buds are just beginning to open, and the second a few days later, depending on the weather, as the buds are in the late mouse-ear to flower bud stage.
990. KUENEN, D. J. 634.11-2.76
Appelbloesemsnuutkever (*Anthonomus pomorum* L.) en gesarol. (Apple blossom weevil and Gesarol.) [English summary $\frac{1}{2}$ p.]
Meded. Direct. Tuinb., 1946, 9: 87-96 [received 1948].
The best time for spraying against the apple blossom weevil is between the end of the hibernation period and the beginning of the egg-laying period. One timely application of 1% Gesarol gives good control, reducing incidence to 1 and 2%. The spray can be applied before, after, or mixed with the usual pre-blossom bordeaux, without reducing its insecticidal value. Early varieties should be sprayed just before the mouse-ear stage; for late varieties the application can be postponed until bud-break.
991. HALLEMANS, A. 634.75-2.76
Het aardbeienhaantje *Galerucella* (= *Galeruca*) *tenella* Linn. (The strawberry leaf beetle.)
Cultuur Hand., 1947, 13: 8: 24-5.
The life history of the strawberry leaf beetle is outlined and the type of damage caused is illustrated. Successful control can be obtained by dusting with a DDT product, derris or 666. The last mentioned should not be used when the fruit is ripening, for it causes an unpleasant taste.
992. VAN ROSSUM, G. 634.72-2.76
Een merkwaardiger bewoner van aalbessen-struiken. (A remarkable inhabitant of currant bushes.)
Fruitteelt, 1947, 37: 162.
A note on the occurrence in currant stubs of the larvae (illustrated) of the beetle *Pyrochroa serraticornis*. It is considered that the insect does not attack sound bushes directly and only enters those that have been weakened by some other cause.
993. SAVAGE, E. F. 634.22-2.76
Plum curculio.
Amer. Fruit Gr., 1948, 68: 2: 23, 60-2.
Present practices in Georgia are discussed. 666 and HETP are being tried experimentally, but the former imparts its odour to the fruit, and the latter is a contact insecticide. A serious problem that remains unsolved is the destruction of larvae in the May drops, which have to be collected at considerable expense.
994. FRÉZAL, P. 632.76: 634.1/2
Deuxième note sur le *Capnodis tenebrionis* L. (Second note on *Capnodis tenebrionis* L.)
C.R. Acad. Agric. Fr., 1947, 33: 651-3.
Stone fruit trees, and pome fruit trees on quince rootstocks are subject to attack by the *Capnodis* wood-boring beetle, whatever their age and vigour. Solutions of methyl

bromide proved superior to other fumigants in soil injection experiments against this pest; they should be employed when the soil temperature is between 15° and 20° C. The amounts applied vary, with the age of the tree and the size of its root system, from 8 to 25 g.

995. MOZNETTE, G. F. 634.521-2.76
DDT for pecan weevil.

Amer. Fruit Gr., 1947, 67: 11: 18.

The following tentative recommendations are made for the control of the pecan weevil in the south-eastern States. Two applications of DDT at 6 lb. of 50% wettable powder per 100 gal. The first may be combined with bordeaux mixture if this is used for scab control; it should be made when at least six weevils can be shaken off a tree, and the second application should be made 10 days later.—U.S.D.A.

996. DELANOUÉ, P. 634.21-2.76

Un parasite nouveau de l'abricotier en Tunisie: *Stenopterus ater* Lin. (A new parasite of the apricot in Tunis.)

Bull. Serv. bot. agron. Tunis. 4, 1946, pp. 8, bibl. 2 [received 1948].

The death of the main branches of apricots in Tunis is attributed to a wood-boring beetle, *Stenopterus ater* L. Suggestions are made for its control.

997. RÉGNIER, R. 632.76

Résultats des recherches de 1947 sur les vers blancs. (Observations in 1947 on cockchafer larvae.)

C.R. Acad. Agric. Fr., 1947, 33: 684-90.

Of horticultural plants the cockchafer attacks chiefly the strawberry and lettuce, but cherries and plums are also affected. For control, the injection of the soil in May with HCH [benzene hexachloride] and S.P.C. [sulphur derivatives of hexachlorocyclohexane] at the rate of 15 to 20 kilos per hectare, is recommended.

998. GÜNTHART, E. 632.76

La lutte contre les vers blancs avec les produits d'hexa. (Control of cockchafer larvae with benzene hexachloride.)

Bull. Soc. ent. suisse, abstracted in *Rev. hort. suisse*, 1948, 21: 61-4, 90-4.

Preparations of benzene hexachloride, applied to the soil as dust or spray, or injected, protected nursery stock against the ravages of cockchafer larvae.

999. BOUCHET, R. L. 632.76

La lutte chimique contre les hannetons. (Chemical control of the cockchafer *Melolontha melolontha*.)

Rev. hort. Paris, 1948, 120: 50-8, bibl. 10.

Adults and larvae can be controlled by using benzene hexachloride as a solution containing 1 or 2% of the technical grade.

1000. ANON. 634.1-2/2.77

Fruit flies (*Strumeta tryoni*).

Agric. Gaz. N.S.W., 1947, 58: 532-4.

The life history and control of the Queensland fruit fly are described. Loquats are considered to be the main host in early infestations (September and October), but citrus may also become infested. Control is effected by the application of foliage poison baits (containing sodium fluosilicate or tartar emetic) or a spray containing nicotine sulphate. The daily collection and disposal of infested fruit during periods of severe infestation are strongly recommended.

1001. DOMATO, J., AND ARAMAYO, H. 634.1-2/2.77

Contribución al estudio de las moscas de las frutas en Tucuman. (Fruit flies in Tucuman.) *Bol. Est. exp. Agric. Tucuman* 60: 1947, 27 pp., illus.

The appearance of the Mediterranean fruit fly (*Ceratitis*

capitata) in Tucuman is considered to be very serious, particularly as American fruit flies (*Anastrepha* spp.) are already present in the province. Its life cycle is completed in 38 days, a period much shorter than that of *Anastrepha fraterculus* under similar conditions (50 days). Control measures recommended are a combination of spraying (with DDT) and biological control. The construction of cages for infested fruit, to retain the fruit flies and allow the escape of their parasites, as formerly recommended (*H.A.*, 10: 1373) has now been modified in order to retain the *Ceratitis* which is smaller than *Anastrepha*.

1002. BONNEMAISON, L. 634.13-2.77

Essais de lutte chimique contre la cécidomyie des poirettes et détermination de l'époque de traitement. (The timing of control measures against pear midge.)

C.R. Acad. Agric. Fr., 1947, 33: 589-92.

The correct timing of the application of an insecticide against the adult pear midge (*Contarinia pyrivora*) is important. The best time is as the sepals are beginning to open so that the tips of the petals just show. In trials recorded the best results were obtained with a 5% DDT dust.

1003. GRISON, P., AND COUTIN, R. 634.13-2.77

Contrôle de la sortie des adultes de cécidomyie des poirettes (*Contarinia pyrivora* Riley) et de l'époque des infestations. (Timing the emergence of the pear midge and the period of infestation.)

C.R. Acad. Agric. Fr., 1947, 33: 592-3, bibl. 4.

A method is described for determining the time of maximum emergence of the adults of the pear midge in the spring in order to time the application of control measures. Frames (described) were placed over soil known to be infested with pupae; the adults were captured in these cages as they emerged from the soil, and counted each day. Observations were made on the stages of development of the flowers, of a number of pear varieties, in relation to the emergence of the midges.

1004. HALLEMANS, A. 634.7-2.78

Een paar schadelijke motjes in de kleinfruitteelt. (Some small fruit moths.)

Cultuur Hand., 1947, 13: 11: 24-5.

Short descriptions, with notes on control, of the currant shoot borer (*Lampronia capitella* Cl.), raspberry moth (*Lampronia rubiella* Bjerk.), cherry leaf sawfly (*Prionophorus padi* L.) and the oriental peach moth (*Laspeyresia molesta* Bush).

1005. VAN KATWIJK, W. 634.722-2.78

Bessenspruitvreter. (The currant shoot borer.) *Fruitteelt*, 1948, 38: 70-1, illus.

The life-cycle of the currant shoot borer (*Incurvaria [Lampronia] capitella*) is outlined and the damage it causes is described. Spraying with 7½% fruit tree carbolineum in the latter half of January is recommended. The spray must be forcibly applied and in sufficient quantity for some to fall on the ground to kill the borers present in the upper layers of the soil.

1006. SOENEN, A. 632.78

Contribution à l'étude du carpocapse. (The codling moth.) *Parasitica*, 1947, 3: 82-91.

Notes are given on the life-cycle of the codling moth. The importance of observations on the spring flight of the adults is emphasized in relation to notification to growers as to the best time to apply control measures. Arsenate of lead is the most generally used preparation for the control of the codling moth in Belgium, but the possibility of using DDT is discussed.

1007. GRAHAM, C., AND CORY, E. N.

632.78 + 632.654.2

Codling moth and European red mite control and seasonal analysis of spray deposits.*J. econ. Ent.*, 1947, 40: 752-4.

In a season favourable for the codling moth the standard sprays, lead arsenate and DDT, gave good control. The residue of DDT on apple trees should exceed 3 g. per lb. foliage during the spraying season, and should reach 8 g./lb. in the middle of August. The red mite population did not become excessive during the season.—University of Maryland.

1008. KEMP, H. K.

632.78

Codling moth control.*J. Dep. Agric. S. Aust.*, 1947, 51: 6-7, 184-6.

In 12 trials carried out in 1945-46 and 1946-47 DDT has consistently given better control of codling moth than lead arsenate. With heavy infestation in small plots 0.1% appears to be optimum, but 0.05% appears to be satisfactory for slight infestations or on large plots. In warm districts increases of *Bryobia* mite invariably followed the use of DDT, but the increase was not serious in cold districts. On irrigated Williams pears mite damage outweighed the reduction in codling moth damage due to DDT.

1009. WHITEHEAD, F. E., AND BEWICK, L. F.

632.78

Further complications of the codling-moth problem.*Proc. Okla. Acad. Sci.*, 1947, 27: 41-5.

The increase in certain insect pests, including spider mites, when DDT is substituted for lead arsenate is discussed. "Di(*p*-phenyl) methyl carbinol" and DN-111 are promising for the control of mites, but the latter may adversely affect the ability of DDT to control codling moths.—Oklahoma Agric. Exp. Stat., Stillwater.

1010. TAYLOR, G. G.

634.11-2.78

Use of DDT in apple spray for control of codling moth.*Orchard. N.Z.*, 1947, 20: 8: 4-5.

Two spray programmes involving the use of DDT are given. As increased populations of red mite are likely to follow from DDT sprays two materials which may overcome this difficulty are discussed. Trials have shown Selocide (a proprietary compound prepared from selenium) to be highly effective against mites, two applications of 1 pint to 100 gal., the first at the pink stage and the second at 75% petal fall, being sufficient to give almost complete control in early summer; one disadvantage is its very toxic nature and care must be taken in its use. Another material HETP (hexa-ethyl tetra-phosphate) has been very effective against mites in preliminary trials, dilutions of less than $\frac{1}{2}$ pint to 100 gal. giving complete control.

1011. RAUCOURT, M.

632.78: 634.11 + 634.13

Les résidus d'arsenic sur les pommes et les poires traitées contre le carpocapse. Deuxième partie. (Arsenical residues on apple and pears treated for the control of codling moth. Part II.) *Ann. Epiphyt.*, 1946, 12: 145-59.

Further observations are recorded (see *H.A.*, 10: 1018) on arsenical residues on fruit. Analyses have shown that arsenic on harvested fruit scarcely exceeds, on the average, 1 mg. per kg., even when spraying is carried out up to a fortnight before picking. The addition of oil to arsenic sprays increases the toxic deposit. Since the commercial varieties of apples are mostly gathered during a short period towards the beginning of October, while pears are picked over a longer period from the end of July to the beginning of October, it follows that the veto on the use of arsenates on apples and pears during the two months preceding the harvesting of fruit is worse for pear growers than apple growers. Reform in French legislation should be directed

towards (a) more liberty in applying arsenical sprays, which should be allowed up to a month before picking the fruit, (b) the inspection for toxic deposits (arsenic and lead) on fruit exposed for sale, and (c) instructing fruitgrowers how to apply effective arsenical sprays without risk of harvesting fruit with too much toxic deposit.

1012. COSTANTINO, G.

634.8-2.78

La tignola dell'uva o verme dell'uva (*Polychrosis botrana* Schiff.). (The vine moth and its control.) *Boll. R. Oss. reg. Fitopat. Acireale* 72, 1939, pp. 14 [received 1948].

Remedies recommended include corrugated paper banding, arsenate of lead for first two generations and nicotine for the third.

1013. ROUSSEL, R.

634.8-2.78

Lutte contre l'eudémis: pulvérisation ou poudrage. (Spraying or dusting to control the vine moth.)

Prog. agric. vitic., 1948, 129: 98-100.

Discusses the advantages, the disadvantages, and the cost of spraying and of dusting with DDT preparations against the vine moth [*Polychrosis botrana*].

1014. BERNON, G.

634.8-2.78

La lutte contre l'eudémis en 1947. (Control of eudemis in 1947.)

Prog. agric. vitic., 1948, 129: 156-63.

Notes are given on the morphology and coloration of the insect and a graph shows the flight periods of the moths. The effectiveness of DDT for its control has been confirmed.

1015. COUTURIER, A.

634.8-2.78

Les noctuelles de la vigne en Alsace. (The owl moths of the vine in Alsace.)

C.R. Acad. Agric. Fr., 1948, 34: 90-2, bibl. 4.

Notes are given on the habits of certain owl moths (particularly *Agrotis* spp.) attacking vines in Alsace. Laboratory tests showed DDT and sodium arsenite to be lethal towards the larvae. A warning is given that autumn applications of insecticides may kill a number of the hymenopterous enemies of the owl moths, while spring applications are not so disadvantageous.

1016. (MINISTRY OF AGRICULTURE.) 632.78: 634.1/7

Magpie moth.*Adv. Leaf. Minist. Agric. Lond.* 65, 1947, pp. 4, illus., 1d.

A description of the magpie or currant moth, plants attacked, nature of damage and methods of control. It can be successfully controlled by the application of insecticides made from derris or lonchocarpus root.

1017. SCHAEFER, L., AND VASSEUR, R.

634.25-2.78

La tordeuse orientale du pêcher (*Laspeyresia molesta* Busk) dans la région lyonnaise. (The oriental peach moth around Lyons.)

C.R. Acad. Agric. Fr., 1947, 33: 716-7.

In 1947 the most severe infestations of the oriental peach moth in the neighbourhood of Lyons were on quinces; in some cases practically all the quinces contained from 1 to 5 caterpillars of this moth. Attacks, but less severe, were seen on pears.

1018. ROUBAUD, E.

634.25-2.78

Présence et dégâts de la tordeuse orientale du pêcher (*Laspeyresia molesta* Busk) dans la région parisienne. (The damage caused by the oriental peach moth around Paris.)

C.R. Acad. Agric. Fr., 1947, 33: 718-20, bibl. 5.

In one orchard the peach varieties Bon Ouvrier and Gross Mignonne had 80% of the fruit attacked while Précoce de Hale (Hale's Early) and Reine des Vergers had but few of their fruit infested. Attacks were observed not only on stone fruits but also on quince and pear.

1019. BERNARD, J. 634.1/2-2.793
Communication sur la présence d'*Hoplocampa brevis* sur poirier dans la région de Malines. (The pear sawfly on pear trees near Malines.) *Parasitica*, 1947, 3: 142-3.
A note on the distribution of fruit tree sawflies in Belgium, with a brief account of the life history of the pear sawfly.

Weeds.*

1020. RASMUSSEN, L. W. 632.964: 577.17
The physiological action of 2,4-dichlorophenoxyacetic acid on dandelion, *Taraxacum officinale*. *Plant Physiol.*, 1947, 22: 377-92, bibl. 25, being *J. Pap. la agric. Exp. Stat.* J-967.
The author's experiments lead him to conclude that the action on dandelion of 2,4-D at killing strength is chiefly the destruction of carbohydrate reserves, mainly by increased respiration. He considers, however, that the changed respiration rate should be classed as a symptom of specific toxic effects rather than the direct cause of injury. Kerosene affected dandelions in the same way, and was almost as effective as 2,4-D with little effect on grass.
1021. WURGLER, W. 632.954
L'importance de l'époque du traitement sur l'action des acides phénoxyacétiques substitués. (The importance of timing on the weed killing action of substituted phenoxyacetic acids.) *Rev. hort. suisse*, 1948, 21: 41-3, bibl. 3.
The dandelion is most susceptible to 2,4-D while it is growing vigorously after flowering, in May.
1022. ELDER, W. C., AND ROMSHE, F. A. 632.954
Chemical control of weeds in Oklahoma for 1948. *Circ. Okla agric. Exp. Stat.* C-128, 1948, pp. 15, illus.
In the second part of this circular, devoted to weeds in horticultural crops, some suggestions, but no recommendations, are made for the chemical control of weeds in asparagus, carrots, onions, peas, potatoes, strawberries, etc. A classification of Oklahoma weeds according to the effect of 2,4-D on them and some recommended spraying rates are given in an appendix.

1023. ANON. 632.954
Bottle technique with 2,4-D. *Plants and Gardens*, 1947, 3: 211.
A weed shrub or vine growing in an ornamental planting may be killed safely by topping it and inserting the cut end into a bottle containing 2,4-D at two or three times the normal strength.
1024. TEMPLEMAN, W. G. 632.954: 577.17
Some scientific aspects of selective weed control. *Gdnrs' Chron.*, 1948, 123: 52-3, 60-1, 68, 76.
An account of the development of Verdene, a selective weed killer whose active principle is 4-chloro-2-methylphenoxyacetic acid; it is of particular value for the control of weeds in grass.—Jealott's Hill Research Station.

1025. WOLCOTT, A. R., AND CARLSON, R. F. 632.954
Preliminary report on field applications of isopropyl-phenylcarbamate in the control of quack grass in an established sod. *Quart. Bull. Mich. agric. Exp. Stat.*, 1947, 30: 218-29, bibl. 8.
Limited field tests of isopropyl-phenylcarbamide (IPC) show that it has little effect on the growing points of new rhizomes of quack grass, *Agropyron repens*, although it does inhibit the growth of dormant buds before the meristematic tissues become covered with an actively growing sheath. Further trials are needed to ascertain the best

time and method of application of IPC; some form of cultivation may be necessary.

1026. STEWART, W. S., AND GAMMON, C. 632.954
Fog application of 2,4-D to wild grape and other plants. *Amer. J. Bot.*, 1947, 34: 492-6, bibl. 5, being *Pap. Calif. Citrus Exp. Stat.* 564.
Fog application of diethanolammonium 2,4-dichlorophenoxyacetate by means of a portable fog-gun was used successfully to kill the wild grape, *Vitis girdiana*. The method is of value in less accessible places, for the gun described can be charged by hand with nearly 3 l. of solution, which is discharged in 20 minutes.

1027. GEYER, J. W. C. 632.96
A study of the biology and ecology of *Exochomus flavipes* Thunb. (Coccinellidae Coleoptera). Part II. Reprinted from *J. ent. Soc. S. Africa*, 1947, 10: 64: 109, bibl. 10.

This article describes further observations on this entomophagous ladybird (*H.A.*, 17: 1365) which is causing extensive destruction of the cochineal insect, *Dactylopius opuntiae*, introduced into South Africa from Australia for the biological control of the pest species of prickly pear.

Vermin.

1028. ROUSSEL, R. 632.69
Le lérot. (The garden dormouse.) *Progr. agric. vitic.*, 1948, 129: 163-4.
The garden dormouse (*Eliomys quercinus* L.) is described and illustrated. It is said to be very destructive in orchards, one in a garden being enough to destroy a crop of peaches or apricots. Control measures are (1) the protection of its natural enemies, the marten, weasel, and tawny owl, (2) traps on railings baited with ripe fruit, (3) destruction during the dormant period, (4) the provision of wooden nesting boxes, placed in the trees; the animals hibernate in these and can be captured during the winter.
1029. KALMBACH, E. R. 632.69
Advances in rodent control. *Yearb. Agric. U.S. Dep. Agric.* 1943-47, pp. 890-6, bibl. 6.
Some of the more interesting advances reported are: the development of "96a", a repellent paint which is effective in preventing damage to trees by rabbits; the use of microcrystalline waxes, water glass and prepared tung oil for minimizing rat damage to waterproofed food packets; the inclusion of emetics in rat poisons so as to reduce the risk of poisoning dogs and cats; the use of pigments in poisoned grain baits so that seed-eating birds are protected (birds react to colour whereas rodents usually do not). The composition of "96a" is given as copper carbonate, copper sulphate and dry lime-sulphur, with synthetic resin and asphalt emulsion dissolved in ethylene dichloride as the adhesive.

1030. CRABTREE, D. G. 632.69
Red squill—most specific of the raticides. *Econ. Bot.*, 1947, 1: 394-401, bibl. 3.
An account of the use of red squill, *Urginea maritima*, as a rat poison. Experimental plantings have been made in California and Mexico.

1031. JOINER, M. 632.693.2
Mounding for mice. *Amer. Fruit Gr.*, 1948, 68: 2: 17.
When frost became continuous the trunk of each fruit tree was protected by a conical mound of sand, 8 in. high; this froze hard and gave better protection against mice tunnelling under the snow than did poison bait.—Michigan.

* See also 812-814, 830, 1098, 1149, 1163, 1376-1379.

Sprays and spraying.

1032. RAUCOURT, M., AND BÉGUÉ, H. 632.95
Revue de phytopharmacie 9e serie. (Ninth review of phytopharmacy.)
Ann. agron. Paris, 1947, 17: 719-64, bibl. 247.

This review covers the following topics:—organic fungicides, mineral insecticides, fumigants, substances that attract or repel insects, weed killers, and technique.

1033. SOENEN, A. 634.1: 581.144.4
La préfloraison des arbres fruitiers à pépins. (Pre-blossom stages in pome fruit trees.)
Fruit belge, 1948, 16: 18-22.

As an aid in timing pre-blossom sprays, 10 stages in the development of apple buds in the spring are described and illustrated.

1034. MINISTRY OF AGRICULTURE LONDON, AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND. 632.951(42) + 632.952(42)
Proprietary products for the control of plant pests and diseases.
Publ. (out of series) Minist. Agric. Lond., 1947, 5th edition, pp. 6.

Contains a list of 196 approved proprietary products, with makers' names. An approved product carries an official mark on its container.

1035. RAUCOURT, M., AND MONTHÉARD, P. 632.95
Nouveaux adjuvants pour les bouillies antiparasitaires agricoles. (New adjuvants for antiparasitic sprays.)
C.R. Acad. Agric. Fr., 1947, 33: 550-1.

The addition of the residuary liquor from molasses has been found to increase the quality of spray fluids. The liquor with the addition of a small quantity of terpineol causes sulphur to become wettable so that it can be mixed with copper sprays for a combined treatment on vines.

1036. DELHAYE, R. 634.8: 632.9
Les traitements phytopharmaceutiques en viticulture sous verre. (Plant protection in viticulture under glass.)
Reprinted from *C.R. 1er Congr. internat. Phytopharmacie, Héverlé, Belgium*, 1946, pp. 16.

Practical advice to the Belgian vinegrower [under glass] of the hygienic precautions which he should take by way of spraying, fumigation, etc., during each season of the year in his vinery.

1037. ARK, P. A. 632.952
Disinfecting power of propylene chloride in relation to phytopathogenic bacteria and fungi.
Abstr. in Phytopathology, 1947, 37: 842.

Among the organisms tested were *Verticillium* sp., *Agrobacterium tumefaciens* (the crown gall organism), and *Corynebacterium michiganense* (the cause of tomato bacterial canker).

1038. ARK, P. A. 632.952
Effect of crystalline streptomycin on phytopathogenic bacteria and fungi.
Abstr. in Phytopathology, 1947, 37: 842.

Streptomycin was found to be toxic to 14 species of phytopathogenic bacteria, both Gram positive and Gram negative. *Agrobacterium tumefaciens* (the crown gall organism) showed considerable resistance to it.

1039. STAGE, H. H., AND IRONS, F. 632.951: 656.7
Air war against pests.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 835-8.

A short general description of the equipment, type of aeroplane and methods used for dispersing insecticides from the air. Investigations showed that the optimum conditions

for spraying from large aircraft were: altitude 150 ft. above ground or tree tops; indicated air speed 170-200 m.p.h.; droplet size of spray, 50-150 microns; wind, 3-10 m.p.h.; line of flight, across wind or within 22-5° of it; distance between lines of flight, 300 ft. With light aircraft it was found necessary to fly within a few feet of the crop. In treating crops from the air uniform swath coverage and close control of dosage are prime essentials.

1040. POPHAM, W. L. 632.951
Blowers for insecticides.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 839-42, bibl. 3.

Tractor-mounted equipment is described in which liquid insecticide concentrate at 30-50 lb. pressure is injected into a high-velocity air stream (160 m.p.h.) so that it is atomized (droplets 150-300 microns) and projected in an even pattern for a considerable distance. With such apparatus it is possible to treat 1 acre with as little as 1-3 gallons of liquid. The apparatus can also be used for dusting. An experimental unit developed from this apparatus gave good coverage of spray (droplets 50-150 microns) for a distance of 125 ft. and adequate coverage for the control of many insects for a distance of 200-300 ft. from the nozzle.

1041. M., F. S. 632.95
The Rudolf Sack sprayer.
Agric. Engng Rec., 1948, 2: 81-2.
ANON.

Low pressure spraying.
Grower, 1948, 29: 541.

The PSN sprayer, made by Rudolf Sack, Leipzig. Air at a pressure of 22½ lb. is used to perform three functions. It drives liquid from the supply tank to the spray boom through a simple "foam maker", also operated by compressed air. The main air supply from the compressor is used to atomize the foam as it leaves the nozzles on the boom. The liquid particle size is so small that spraying at the rate of 18 gallons per acre is sufficient for most crops. The machine can also be used for applying dusts at rates between 8 and 18 lb. per acre.

1042. PORTER, B. A. 634.1/7-2.951
Orchard insecticides.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 659-62.

Includes brief notes on some newer insecticides, such as nicotine bentonite, phenothiazine, xanthone, DDT, benzene hexachloride, dinitro-*o*-cyclohexylphenol, dinitro-*o*-cresol, dichloroethyl ether, dichloroethyl formal, ethylene dichloride, propylene dichloride.

1043. BONNEMAISON, L. 632.951
Un nouvel insecticide organique de synthèse du groupe des esters phosphoriques mixtes. (A new synthetic organic insecticide pertaining to the phosphoric esters.)
C.R. Acad. Agric. Fr., 1947, 33: 554-6.

A new insecticide, referred to as mixed phosphoric esters until its exact chemical composition has been ascertained, has given most promising results against a number of crop pests, such as the turnip sawfly (*Athalia colibri* Christ), the cabbage shield bug (*Eurydema ornatum* L.), the green apple aphid (*Aphis pomi*), and red spider (*Tetranychus telarius*).

1044. ZIMMERMAN, P. W., AND HARTZELL, A. 632.951
Hexaethyl tetraphosphate and tetraethyl pyrophosphate: I. Their effects on plants. II. Their toxicities to insects and mites.
Contr. Boyce Thompson Inst., 1947, 15: 11-19, bibl. 4.

HETP and TEPP (said to be the active ingredient of HETP) induced epinasty when applied to the soil in solution or when heated to 135° C.; the formation of ethylene seems to

be responsible. No such response was caused when the chemicals were applied as sprays or aerosols, but many plants were injured. Both chemicals gave satisfactory control of red spider (*Tetranychus bimaculatus*), larvae and adults, and of mealy bug (*Pseudococcus citri*) larvae; eggs were not affected. Hexamethyl tetraphosphate was less toxic to plants and gave a perfect kill of red spider at 1 : 2,000 in water.

1045. DU PLESSIS, C., AND SMIT, C. 632.951: 632.728
Preliminary laboratory experiments with DDT and 666 as locusticides.
Reprinted from *J. ent. Soc. S. Africa*, 1946, 9: 82-8, bibl. 2.

There are indications that both 666 and DDT will prove to be efficient substitutes for sodium arsenite in baits. As dusts both are less efficient than DNOC dust, especially against flyers.

1046. RIPPER, W. E., AND OTHERS. 632.951
New formulation of D.D.T. with selective properties.
Nature, 1948, 161: 484.

A method is described whereby particles of DDT are coated with degraded cellulose; the coated DDT is relatively ineffective as a contact insecticide, but toxic to phytophagous insects.—Pest Control Ltd., Harston, Cambridge.

1047. PETTY, B. K. 632.951
Miscellaneous D.D.T. studies, with special reference to some common agricultural pests.
Sci. Bull. S. Afr. Dep. Agric. 276 (*Ent. Ser.* 21), 1946, 16 pp., bibl. 13.

Only a few plants are adversely affected by DDT, if it is suitably applied. The most important of these belong to the cucurbit family. Oil solutions should not be used on plants. It is considered that, used with ordinary care and correct insecticidal strength, DDT is a safe insecticide so far as man and farm animals are concerned. Its toxicity has been compared with that of other insecticides in relation to the control of some common insect pests. Benzene hexachloride is more toxic to the bagrada bug (*Bagrada hilaris* Burm., a pest of cruciferous plants) than DDT, but satisfactory control was obtained with both. DDT was disappointing for the control of the wattle bagworm (*Acanthopsyche junodi* Heyl.). DDT is highly toxic to the cabbage caterpillar (*Plutella maculipennis*), eucalyptus snout beetle (*Goniapterus scutellatus*) and cochineal insects. As a soil insecticide for the control of the citrus snout beetle (*Sciobius granosus*) DDT was inferior to interstill residue, polymethylnaphthalene and pentachlorophenol.

1048. STEUK, W. K. 634.8-2.951
New pests follow DDT in vineyards.
Amer. Fruit Gr., 1948, 68: 2: 24, 52, 57.

DDT has given excellent control of the grape berry worm, but it may be necessary to revert to the use of lead arsenate, nicotine and summer oil to control other pests that may become serious.—Ohio.

1049. FREZAL, P., AND GRIESSINGER, C. 632.951
Note sur l'action des traitements à base de D.D.T. et de S.P.C. sur les abeilles. (The effect of DDT and SPC [see abstr. 997] on bees.)
C.R. Acad. Agric. Fr., 1947, 33: 656-60.

The chief conclusion drawn from the observations is that neither DDT nor SPC has any appreciable insecticidal effect on bees.

1050. BOVEY, P. 632.951: 638.14
Les traitements antiparasitaires et l'apiculture. (Pest and disease control in relation to bee-keeping.)
Publ. Stat. féd. Essais vitic. arbor. Chimie agric. Montagibert 354, 1947, pp. 11.

Fungicidal and insecticidal treatments in the orchard are

discussed in relation to their effect on bees. Treatments involving the use of arsenic, DDT or 666 should not be given when the trees are in flower. If there are nectariferous flowers under the trees to be treated the plants should be mown down before the applications, or in the case of dandelion the spray should be applied when the flowers are closed. Colza should be treated with DDT or 666 against the pollen beetle, *Meligethes aeneus* F., when the plants are still in bud and not when they are in flower. In potato plots weeds in flower should be pulled up before an application of arsenate or DDT.

1051. MCGREGOR, S. E., CASTER, A. B., AND FROST, M. H., JR. 632.951: 638.14
Honeybee losses as related to crop dusting with arsenicals.
Tech. Bull. Ariz. agric. Exp. Stat. 114, 1947, pp. 219-46, bibl. 53.

This paper discusses bee poisoning with arsenicals, drift of applied arsenicals, normal and lethal doses of arsenic per bee, arsenical content of pollen and bee brood, and the value of pollen identification in connexion with such a study.

Insecticidal plants.

1052. ROARK, R. C. 632.951
Some promising insecticidal plants.
Econ. Bot., 1947, 1: 437-45, bibl. 49.

The plants discussed include *Haplophyton cimicidum*, *Heliopsis longipes*, *Ryania speciosa*, *Tripterygium wilfordii* (thunder god vine), *Anabasis aphylla*, *Croton tiglium*, *Amorpha fruticosa*, *Schoenocaulon officinale* (sabadilla), *Sesamum indicum*, *Phellodendron amurense*, *Zanthoxylum clavaherculis*, the quassias *Aeschron excelsa* and *Quassia amara*, and *Duboisia hopwoodii*.

1053. HIGBEE, E. C. 632.951
Lonchocarpus—a fish-poison insecticide.
Econ. Bot., 1947, 1: 427-36.

Most of the *Lonchocarpus* root exported from South America is grown on a small scale by peasants. The bush is felled and burned, and leafless stem cuttings, 10 to 18 in. long and $\frac{1}{2}$ to 2 in. diameter, are planted; food crops are interplanted during the first year. The *Lonchocarpus* roots are harvested in the third year. The systematics of the *Lonchocarpus* spp. grown are obscured by their reluctance to flower. Plant collections at the Instituto Agronomico del Norte, Belem, Brazil, at Tingo Maria, Peru and at the Ecuador Agricultural Experiment Station at Pichilingue, include strains varying in yield of roots and rotenone content.

1054. PERKINS, J. F. 632.951: 615.779.1
The correlation between monthly rainfall and the monthly pick of pyrethrum.
Kenya Pyrethrum News, 1947, 1: 9: 10-11.

A graph is reproduced, based on 1942-47 records from one Kenya estate, from which the author concludes that there is a fairly regular and well-defined relationship between the crop of pyrethrum flowers picked in any particular month and the amount of rain which fell 2 months earlier. It is suggested that if the figures quoted are of wider application they are of practical interest in planning harvesting operations.

1055. ANON. 632.951: 615.779.1
The cultivation of pyrethrum in Kenya.
Publ. (out of series) Pyrethrum Board of Kenya, 1947, pp. 15, bibl. 10, illus.

This pamphlet, prepared under the direction of the Pyrethrum Agricultural Research Advisory Committee for the assistance of growers, briefly covers the subject of pyrethrum growing as carried out at present in the Kenya highlands. It deals with: choice of site and soil, rainfall, preparation of land, manures, planting material, sowing and transplanting, cultivation, picking and grading, cutting back, pests and

diseases, yields, life of plantations and fuel for drying flowers. Photographs illustrate the ideal stage at which to pick pyrethrum flowers.

1056. GADDUM, E. W. 632.951: 615.779.1
Pyrethrum experimental work 1944-46 and 1946-47.

Publ. (out of series) Pyrethrum Board of Kenya, 1947, pp. 1-35 and 36-71.

1944-46: Short descriptions are given of the Molo and Ol Joro Orok Experimental Stations (8,300 and 7,800 ft. a.s.l.) opened in 1944-45 and of the numerous trials laid down. These trials include tests of: a pyrethrum strain of high toxicity, seedlings *versus* splits, spacing and cultivation methods, skill of workers in transplanting, fertilizers (lime, phosphates and mulch), interplanting (with maize and broad beans), cutting back methods, repeated trimming, regeneration methods. Investigations were also begun on blind plants, petal-less flowers and the root system of pyrethrum. The results from some of the above work are reported and the statistical significance of the results shown. 1946-47: Three more new experimental stations, S. Kinangop (8,300 ft.), Subukia (7,000 ft.) and Kitale (6,300 ft.) are described and further results from 1944-46 experiments recorded. Notes are given on two new experiments, a rotation trial and an ox-cultivation experiment. A new disease of pyrethrum, caused by *Ramularia bellunensis*, was reported in the Molo area in July, 1946, where it caused considerable damage. The disease, which attacks buds and flowers, and sometimes leaves, has since spread to other pyrethrum areas in Kenya. The results of spraying trials against thrips, using lime-sulphur, nicotine and Gammexane, are reported.

1057. GADDUM, E. W. 632.951: 615.779.1

Blind [pyrethrum] plants.

Kenya Pyrethrum News, 1947, 1: 12: 12 and 2: 1: 10-11, illus.

An account of a small-scale experiment extending from 19.7.45 to 31.8.47 to observe the flowering of so-called blind plants. Except for a brief period at the end of 1946 the blind plants remained flowerless, or nearly so, their yield of flowers being about one-third that of normal plants. It is concluded that blind plants in a plantation should be uprooted as soon as recognized, and replaced by normal ones.

1058. BECKLEY, V. A. 632.951: 615.779.1

The principles of pyrethrum drying.

Kenya Pyrethrum News, 1946, 1: 2: 15-17 [received 1948].

After briefly referring to the history of pyrethrum drying in Kenya and the losses which can result from faulty methods, the author discusses what goes on during the drying process in various forms of dryer working under different conditions. Brief reference is made to the possibility of using infra red electric lamp dryers.

1059. (BECKLEY, V. A.) 632.951: 615.779.1

Production of pyrethrum sprays by direct percolation.

Kenya Pyrethrum News, 1946, 1: 2: 13 [received 1948].

Details of a simple and inexpensive method for use by insecticide manufacturers who wish to extract pyrethrins from small quantities of flowers without having to purchase costly equipment.

1060. RAYMOND, W. D. 632.951: 615.779.1

A note on the possibility of the stabilization of pyrethrum.

E. Afr. agric. J., 1948, 13: 162-3, bibl. 2.

A short account of experimental work on the inactivation of the oxidases in pyrethrum flowers and the resulting stabilization of the dried product. If laboratory findings can be translated into practice, sulphur dioxide treatment

would result in a product containing 15-20% more pyrethrins which would be more stable than the dried pyrethrum flowers at present produced, while, in addition, the pyrethrum content of the flowers would be largely independent of variations in drying methods employed.

Noted.

1061. a AKESSON, N. B. 632.954

Equipment for chemical weed control.

Calif. Citogr., 1948, 33: 226-7, 238, 240.

- b BERTELLI, J. C. 634.25-2.4

Anatomía y patología de las lesiones gomosas de las ramas del duraznero (*Prunus persica* Sieb. et Zucc.). (Anatomy and pathology of gummy lesions on peach branches.) [English summary 16 l.]

Rev. Asoc. Ingen. Agron. Montevideo, 1947, 19: 11-32, bibl. 3.

- c BOUGARD, M. 632.42

Traitements contre la tavelure. (Control of apple and pear scab.)

Courr. hort., 1947, 9: 396-8, 454-6.

A popular illustrated account.

- d COSTANTINO, G. 632.78: 634.11 + 634.13

Il verme delle mele e delle pere (*Cydia [Carpocapsa] pomonella* L.). (Codling moth of apples and pears.)

Boll. R. Staz. sper. Frutt. Agrum. Acireale 73, 1940, pp. 24 [received 1948].

- e COSTANTINO, G. 632.796

La formica argentina (*Iridomyrmex humilis* Mayr.). (The Argentine ant.)

Boll. R. Staz. sper. Frutt. Agrum. Acireale 77, 1941, pp. 12 [received 1948].

- f COSTANTINO, G. 634.1/2-2.77

La mosca delle frutta (*Ceratitis capitata* Wied.). (The Mediterranean fruit fly.)

Boll. R. Staz. sper. Frutt. Agrum. Acireale 78, 1941, pp. 13 [received 1948].

- g DEMAREE, J. B. 634.73-2.4

Thelephora terrestris on blueberry plants.

Phytopathology, 1947, 37: 930-1.

- h DUNEGAN, J. C. 634.23-2.4

The occurrence of *Monilinia seaveri* on English morello cherry.

Phytopathology, 1947, 37: 929-30.

- i FERREIRA, J. D. 632.78: 632.96

Um fungo parasita da "*Cydia pomonella*" L. (A fungus parasitic on the codling moth.)

Rev. agron., Lisbon, 1943, 31: 85-117, bibl. 47 [received 1948].

A species of *Beauveria*.

- j GARMAN, P. 634.11: 632.77

Control of the apple maggot with rotenone dusts.

Bull. Conn. agric. Exp. Stat. 474, 1943, pp. 436-42, bibl. 3, illus. [received 1948].

- k GARMAN, P. 632.951

A study of stickers for lead arsenate sprays on fruit trees.

Bull. Conn. agric. Exp. Stat. 485, 1945, pp. 109-61, bibl. 38, illus. [received 1948].

- l GROVES, A. B. 634.11-2.4

Apple rust controlled by airborne application of Fermate.

Abstr. in Phytopathology, 1948, 38: 11.

- m HARTZELL, A. 632.951

Additional tests of plant products for insecticidal properties and summary of results to date.

Contr. Boyce Thompson Inst., 1947, 15: 21-34, bibl. 54.

- n JOHNSON, J. 633.71-2.8
Virus attenuation and the separation of strains of specific hosts.
Phytopathology, 1947, 37: 822-37, bibl. 17.
- o (MINISTRY OF AGRICULTURE.) 634.11-2.42
Apple mildew [*Podosphaera leucotricha*].
Adv. Leaf. Minist. Agric. Lond. 205, 1947, pp. 3½, illus., 1d.
A popular description.
- p (MINISTRY OF AGRICULTURE.) 632.78
Winter moths [*Operophtera brumata*, *Hybernia defoliaria* and *Erannis aescularia*].
Adv. Leaf. Minist. Agric. Lond. 11, 1947, pp. 4, illus.
- q MORGAN, O. D., JR., AND POWELL, D. 634.11-2.42
Specificity of certain Bioquin (8-quinolinol) derivatives and some of their formulations for apple-scab control.
Abstr. in *Phytopathology*, 1948, 38: 18-19.
- r NEWELL, I. M. 632.654.2: 634.1/3
Quantitative methods in biological and control studies of orchard mites.
J. econ. Ent., 1947, 40: 683-9, bibl. 3.
- s PEET, C. E. AND TAYLOR, C. F. 634.23-2.4
Apple bitter rot [*Glomerella cingulata*] on sour cherry in West Virginia.
Abstr. in *Phytopathology*, 1948, 38: 20-1.
- t PRESTON, D. A. 632.3/4: 633/635
Host index of Oklahoma plant diseases, supplement, 1947.
Tech. Bull. Okla. agric. Exp. Stat. T-21 (supplement), 1947, 39 pp.
- u PRICE, F. E., AND OTHERS. 632.954
Recommendations for weed spraying equipment.
Circ. Ore. agric. Exp. Stat. 170, 1946, pp. 20.
- v QUISUMBING, E. 632.951
Philippine plants used for arrow and fish poisons.
Philipp. J. Sci., 1947, 77: 127-77, bibl. 69.
- w RUSSELL, L. M. 632.754(7)
The North American species of whiteflies of the genus *Trialeurodes*.
Misc. Publ. U.S. Dep. Agric. 635, 85 pp., bibl. 23.
Thirty-four species described and illustrated.
- x THOMAS, J. E., AND RIKER, A. J. 632.314: 577.17
The effects of representative plant growth substances upon attenuated-bacterial crown galls [on 4,900 plants].
Abstr. in *Phytopathology*, 1948, 38: 26.
- y TONDEUR, R. 632.951: 615.779.1
Dosage des pyrèthres dans les fleurs de pyrèthre. (The estimation of pyrethrins in pyrethrum flowers).
Bull. agric. Congo belge, 1947, 38: 887-90.
The Wilcoxon method is recommended.

VEGETABLES* AND MISCELLANEOUS TEMPERATE CROPS.

General.

1062. BRAUN, E., AND WALKOF, C. 631.586: 635.1/7
Hints on dry land gardening [in Canada].
Publ. Dep. Agric. Canada 619, 1947, pp. 8, being *Circ.* 132, illus.

Hints on vegetable gardening based on results obtained in drought areas during the "dry thirties". Stress is laid on the need for trapping snow and conserving its spring run-off. It is recommended that half the garden be summer fallowed. Practical advice is given covering operations from the preparation of the soil to the control of weeds, insects and diseases. There is a short final section on vegetables for winter use.

1063. YOUNG, E. C., AND HARDIN, L. S. 631.5: 635.1/7
Simplifying farm work.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 817-23, bibl. 10.

Advice is given on how to set about improving the efficiency of any job on the farm. Examples are given showing the extent of the savings in labour resulting from improved methods in tobacco production, celery growing and marketing, cutting seed potatoes and other operations.

1064. MCGUFFIE, D. 635.1/9: 631.51
Recent developments in machinery for market gardening.
Agriculture, 1948, 54: 549-52.

Writing from personal experience the author notes the advantages to be derived from the following recent introductions in market gardening machinery:—hydraulic linkage, the small tractor for row work and the fitting to such a tractor of a spray line pump and tank for weed control. The future should see many fresh attachments to these small tractors, notably for harvesting.

1065. GRAHAM, T. O., AND SHOEMAKER, J. S. 635.1/7(713)
Vegetable varieties and hybrids [in Ontario].
Bull. Ontario Dep. Agric. 451, 1947, pp. 91, illus.

* See also 790, 791, 987, 997-999, 1020-1026, 1508, 1525.

A comprehensive account by two of the staff at the Ontario Agricultural College, Guelph, of the characteristics of 42 kinds of garden vegetable grown under the widely differing conditions of the Ontario climate. Particular attention is paid to the legumes including the different types of beans and peas, to sweet corn and tomatoes.

1066. (JOHN INNES.) 635.1/8: 631.53
Growing pure seed.
Leaf. John Innes hort. Inst. 6, forming part of *The fruit and the soil*, Oliver & Boyd, Edinburgh, 1948, pp. 50-61, 3s. 6d.

This is mainly on vegetable seed. The different needs of "Commercial seed", i.e. seed sown to produce a crop for eating or feeding, and "Stock seed", i.e. seed sown to produce further identical seed, are pointed out and methods of keeping seed pure are detailed. Isolation by time ensures absence of cross pollination owing to different times of flowering. Isolation by distance is generally practised. The simple recommendations made are so important as to be worth repeating verbatim:—"All crops (1) Keep stock seed and commercial seed separate. (2) Grow all seed crops in clean ground and sow from clean seed drills to prevent mixed crops. (3) Thresh all seed crops in clean machines, and store under clean conditions, to prevent admixture of seed. Cross pollinators (4) When growing commercial seed, separate varieties whose flowering times overlap, by at least 50 yards, more if the plots are small. (5) Rogue stock seed crop every year. (6) When growing stock seed separate varieties whose flowering times overlap, by at least 400 yards, more if the plots are small. If contamination will be obvious and roguing complete, this distance may be reduced to 50 yards."

1067. BATEMAN, A. J. 635.1/7: 631.531
Contamination in seed crops. III. Relation with isolation distance.*
Heredity, 1947, 1: 303-36, bibl. 14.

A common formula is derived for the effect of distance on contamination in insect- and wind-pollinated crops; the

* Part I *J. Genet.*, 1947, 48: 257-75, Part II *Heredity*, 1947, 1: 235-46; *H.A.*, 18: 359.

degree of contamination observed at two distances can be used to predict what will be found at a third.—John Innes Horticultural Institution.

1068. HORNE, F. R. 631.531

Better seeds better crops.

Food and Agric., 1948, 1: 278-80.

An account of the work of the National Institute of Agricultural Botany, Cambridge, on seed testing and the multiplication and testing of new varieties and strains.

1069. MILLER, P. W., AND McWHORTER, F. P. 631.531.17

The use of vapor-heat as a practical means of disinfecting seeds.

Phytopathology, 1948, 38: 89-101, bibl. 6.

A method of disinfecting seeds by vapour-heat is described. The practical control of *Phoma betae* on and within sugar beet and table beet seed-balls by this method is indicated, and preliminary tests show that it will kill *Sclerotinia sclerotia* contaminating cabbage seed. The advantages of the treatment are that (1) temperature control is not critical as for hot water treatment, (2) treatment periods are shorter than for dry heat, and (3) the difficulty of drying seed which limits the use of hot water is eliminated by proper vapour-heat procedures.—Oregon Agricultural Experiment Station, Corvallis.

1070. ANON. 631.82

Vermiculite—new plant growing aid.

Market Gr. J., 1948, 77: 4: 15, 24, 26.

A survey of reports by workers at various agricultural experiment stations in the United States. The use of vermiculite as a soil amendment is discussed.

1071. WALLACE, A., TOTH, S. J., AND BEAR, F. E. 635.1/7: 581.192

Sodium content of some New Jersey plants.

Soil Sci., 1948, 65: 249-58.

The Na content of the cultivated plants examined varied from nil to 3.00% of their dry weight. Cranberry and huckleberry plants were notably low in Na, their averages being 0.01% and nil respectively. Of 21 common vegetables, cabbage, carrot, radish, spinach, and beet contained the highest percentages of Na. When grown on normal soils with or without the applications of Na, beets, cabbage, cucumbers, Ladino clover, parsnips and radishes accumulated Na, but alfalfa did not.

1072. HARPER, H. J. 635.1/7: 631.415

Crop adaptation to soils of varying acidity or alkalinity.

Bull. Okla agric. Exp. Stat. B-316, 1947, pp. 15.

Among topics discussed is the control of common diseases of vegetables by altering the soil reaction.

1073. SPENCER, E. L. 635.1/7: 631.536

Reduced loss of transplanted seedlings [vegetable].

Market Gr. J., 1948, 77: 1: 18, 23, 31.

Survival can be increased by spraying the seedlings with a fungicide before transplanting. Starter solutions enable transplants to get away to a better start, although they do not reduce losses. In dry weather hand setting is superior to machine planting in Florida.

1074. COHEN, S. I. 632.95

Development of fungicidal aerosols as foliage protectants.

Abstr. in Phytopathology, 1948, 38: 6.

One aerosol treatment using an organic copper formula produced 96.5-100% protection for 15-30 days against rose black spot, bean powdery mildew, bean anthracnose and tomato early blight.

1075. YARWOOD, C. E. 635.65: 632.952

The fungicidal value of mixtures of lime sulphur and zinc sulphate.

Phytopathology, 1947, 37: 852-3.

Mixtures of zinc sulphate and lime-sulphur were more

fungicidal than expected on the basis of additive action when used as eradicants for bean rust, protectants against bean powdery mildew, protectants against hop downy mildew, and protectants against snapdragon rust. Iron sulphate and copper sulphate were also tested separately as supplements to lime-sulphur and disodium ethylene bisdithiocarbamate; all combinations were synergistic for bean rust but not so much so as zinc sulphate with these fungicides.

1076. WHITE, W. H. 635.1/7: 632.951

Insecticides for vegetables.

Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 663-9, bibl. 3.

Short accounts are given of the origin and uses of the following: pyrethrum, rotenone, cryolite, DDT, sabadilla and soil fumigants.

1077. WENE, G. P. 635.1/7: 632.951

The fog aerosol machine to control vegetable insects.

J. econ. Ent., 1947, 40: 675-9, bibl. 5.

The aerosol method of applying DDT, Rothane, pyrethrum, and piperonyl cyclohexenone gave good control of the garden flea hopper, *Halticus bracteatus*, on tomatoes, particularly when a hood was used to confine the fog. Kerosene, in the amounts used in this method, does not appear to injure vegetable foliage.—Texas Agric. Exp. Stat.

1078. STANILAND, L. N. 632.943: 635.1/3

A home-made dusting machine.

Agriculture, 1948, 54: 518-24, illus.

Very detailed and clearly illustrated instructions are given for making a small and a large size dusting machine, the estimated cost of the materials and labour for the small model being 6s. and for the large £4 10s. The larger machine could be used for any crops in the seedling stage, e.g. flea beetle control on turnips, or on brassicas for downy mildew control.

1079. JACKS, H. 631.462: 635.1/7: 632.651.3

D-D for disinfecting soil.

Orchard. N.Z., 1947, 20: 3: 8-9.

D-D is very effective in controlling eelworms of tomatoes, carrots, etc. In potting soil treated in airtight containers it ensures a 60% control of damping-off and wilt diseases and kills 30% of the weed population. It may be used for disinfecting potting soil in bulk and soil *in situ* in glasshouses and out of doors, by injection at the rate of 3-5 ml. per sq. ft. at a depth of 5 to 8 inches. The soil should be left undisturbed for 48 hours, after which it should be forked or disked for aeration and left for a minimum period of 3-4 weeks before planting. D-D should not be applied within 2-3 feet of living plants.

1080. NEWHALL, A. G., AND LEAR, B. 635.1/7: 632.944: 631.462

Soil fumigation for fungus control with methyl bromide.

Phytopathology, 1948, 38: 38-43.

The tabulated results of trials with beets, cucumber, peas, tomatoes and spinach, show that the ease with which methyl bromide can be handled, the absence of lachrymating and of dangerous phytocidal properties and its rapid penetrating power may recommend it to growers who want a quick, labour-saving way to treat their seed bed or potting soil and are willing to pay a premium for a less disagreeable and quicker method than that afforded by formaldehyde, steam, or chloropicrin.

1081. JACKS, H. 631.462

Formalin—a soil fungicide.

Orchard. N.Z., 1947, 20: 6: 2-3.

Formalin treatment of fungous infected soils has been used successfully by growers when a 1 in 50 solution is applied at the rate of 50 gal. to 15 sq. yards of soil surface. Failure to obtain effective control may result from faulty application or the formation of paraformaldehyde which sometimes

occurs during storage. Formalin showing paraformaldehyde precipitate should not be decanted but stirred well before dilution. If held in drums, these should be rolled to ensure thorough mixing. Cloudy formalin solutions showing an appreciable amount of precipitate should be used at greater concentrations than fresh formalin (i.e. 1½ to 2 in 50). A machine for the automatic application of fertilizers or soil-sterilizing solutions is illustrated.

1082. JACKS, H. 631.462
Implements for soil disinfection.
Orchard. N.Z., 1947, 20: 4: 10-12.

Attempts to secure satisfactory distribution of fumigants have led to production of several implements for soil disinfection and some of these are described and illustrated. One, a hand operated injector made entirely of brass, contains very few parts and has only one cardboard washer, easily replaceable. Others are machines for treatment of large areas in and out of doors.

1083. JACKS, H. 631.462
A useful soil injector.
Orchard. N.Z., 1947, 20: 1-2: 8-9.

An instrument for injecting volatile disinfecting liquids, such as chloropicrin, Shell DD, carbon disulphide, etc., into the soil is described with diagrams and photographs.

Garden vegetables.

1084. BANGA, O. 635.11: 631.531
 Invloed van de zaaitijd op de productiviteit van krotten. (Influence of time of sowing on yield of red table beets.) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, 10: 608-17.

In long rooted varieties of beetroot sowing after the middle of May produced slower root development than sowing before that time. Sowing in the later part of April yielded, in certain trials, a larger root in a shorter time than sowing in the latter part of May. In round varieties sowing after the middle of June produced slower root development than sowing before that date.

1085. BANGA, O. 635.11: 631.531
 Invloed van de zaaitijd op de loofontwikkeling van krotten. (Influence of time of sowing on development of foliage of red garden beets.) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, 10: 692-705, bibl. 3.

When the seed is sown in the first half of May, the average weight of foliage per plant of the long varieties and most of the round varieties of table beet tested increases till the middle of August, and then decreases.

1086. SEVERIN, H. H. P., AND DRAKE, R. M. 635.11: 632.8
Weeds experimentally infected with beet-mosaic virus.

Hilgardia, 1947, 17: 569-76, bibl. 8, illus.
 Six species of weeds in three genera in the family *Chenopodiaceae* were experimentally infected by mechanical inoculation with the virus extract from sugar-beet mosaic. Systemic infection resulted in all.

1087. DUNN, E. 635.12: 632.793
The turnip sawfly [*Athalia colibris*].
Farming, 1948, 2: 24-6, illus.

A rare pest in Britain since the beginning of the century, the turnip sawfly made a serious reappearance on crops in Jersey in the autumn of 1947. DDT dust, 5%, was found very effective in checking this epidemic in some fields. The pest may also attack cabbages.

1088. JARY, S. G., AND MORETON, B. D. 635.12: 632.793
Occurrences of the turnip sawfly, *Athalia rosae* Linné (Auct.) in England, 1947.
Ent. mon. Mag., 1948, 84: 42-3, bibl. 4.

The widespread distribution of the turnip sawfly in England

in 1947 indicates that it may continue to breed locally for some years. It can be controlled easily by insecticides.—N.A.A.S., Wye.

1089. GAWADI, A. G. 635.13: 581.192
The sugars of the roots of *Daucus carota*.
Plant Physiol., 1947, 22: 438-51, bibl. 12.

The yeast technique was applied to carrot tissue extract for separating the non-fermentable reducing matter generally taken for reducing sugars.—Cambridge.

1090. SAÏD, H., AND EL SHISHINY, E. D. H. 635.15: 581.11
Respiration and nitrogen metabolism of whole and sliced radish roots with reference to the effect of alternation of air and nitrogen atmospheres.
Plant Physiol., 1947, 22: 452-64, bibl. 34.

In air mature roots of radish, *Raphanus sativus aegyptiacus*, respire at a low rate that remains steady for long periods. Slicing the root is followed by a rapid, irregular increase in the respiration rate for about 25 hours, after which respiration settles down to a level rather higher than that of the whole root. Transference of slices to nitrogen decreases respiration; on return to air the rate is greatly increased at first, gradually settling down to the normal level in air after 48 hours. The relation between respiration in air and in nitrogen indicates that oxidative anabolism is much lower for radish than has been reported for apple fruits. Nitrogen fractions—little change takes place in whole roots; in slices protein synthesis accompanies the increase in respiration.—Fouad I University, Cairo.

1091. TAYLOR, R. E., CRONSHAY, J. F. H., AND DILLON WESTON, W. A. R. 635.15: 631.531.17
Seed disinfection. VIII. Radishes.
J. agric. Sci., 1947, 37: 267-9, bibl. 3.

The seeding rate of radish may be influenced by the mechanical effect of the material with which it is treated. The seedling emergence of radishes may be improved by treating the seed with an organomercury seed disinfectant. The beneficial effect is correlated with adverse weather conditions at the time of germination, and advantages are therefore usually confined to early sowings. [Authors' summary.]

1092. HEATH, O. V. S., AND OTHERS. 635.25
Studies in the physiology of the onion plant. III. Further experiments on the effects of storage temperature and other factors on onions grown from sets.
Ann. appl. Biol., 1947, 34: 473-502, bibl. 16.

The experiments described concerned combinations of the factors: storage of sets at high and low temperatures during the winter, variety, set size, set planting date and nitrogen manuring. Bolting, yield and ripening data are recorded. Storage temperatures of from 20° to 24° C., applied for about 14 weeks from October onwards, can be used to control bolting and to increase the yield, even of non-bolting strains, by delaying ripening and so extending the growth period. Storage at 24° C. is more effective in preventing bolting than lower temperatures, but 20° C. is probably more effective in delaying ripening. Storage at 0° C. gives partial control of bolting and has no effect on ripening. Late planting effectively controls bolting but causes loss of yield. Nitrogen manuring had practically no effect on yield.—R.H.S., Wisley.

1093. HARTSEMA, A. M. 635.25: 581.14
De periodieke ontwikkeling van *Allium cepa* L. var. Zittauer Riesen. (The periodic development of the Giant Zittau onion.) [English summary 2 pp.]
Meded. Landbhooges. Wageningen, 1947, 48: 6: 265-300, being *Meded. Lab. PIPhyiol. Onderz. Wageningen* 75.

Details are given of the development of onion plants from sowing the seed (about the middle of April) onwards, with

particular reference to the development of the flowers in the stored sets. Flower initiation takes place about the beginning of December. The various stages are illustrated. The optimum temperature for flower formation in Giant Zittau is 13° C. Flower formation begins first at 5°-13° C. Later, flowers are formed at 2° C. also, and at 17° and 20° C. (a few) but not at higher temperatures. Initial storage at a high temperature followed by storage at 5° or 9° C. results in abundant flower formation, whereas an initial low temperature (5°-13° C.) followed by 23° or 28° C. results in few or no flowers.

1094. JONES, H. A., AND CLARKE, A. E. 635.25
The story of hybrid onions.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 320-6.

An account of an onion breeding project in the U.S.A. and the production of Californian Hybrid Red No. 1, introduced in 1944, from which a yield of over 73,000 lb. per acre has been reported in California. This hybrid combines delayed bolting with early maturity and is adapted to the south-west, where the seed is sown in early autumn. There are notes on breeding for resistance to downy mildew, pink root and thrips.

1095. WALKER, J. C. 635.25: 632.1/4 + 632.8
Onion diseases and their control.
Fmrs' Bull. U.S. Dep. Agric. 1060, 1947, pp. 26.

An account is given of the diseases of onions, and a descriptive key and 16 illustrations aid their recognition. Onion smut can be controlled by formaldehyde drip or by Arasan dust applied to the seed with Methocel sticker. Most of the other diseases are not readily controlled by chemicals, and reliance must be placed on crop rotation, timely cultivation, fertile soil, the use of resistant varieties and disease-free bulbs, sets and seed, sanitation, steam sterilization, and proper methods of handling, curing, and storage, as suggested in this bulletin.

1096. NELSON, R. 635.25: 632.4
Onion-mildew control in 1947.
Abstr. in *Phytopathology*, 1948, 38: 19.

Significant yield increases from mildew control alone, on onions, were obtained with Dithane dust 29%, Cuprocid dust 21%, Dithane HE 178 17%, Dow 612 12% and bordeaux mixture 8%.

1097. SEMENIUK, G., AND WADLEY, B. N. 635.25: 632.4

Pythium seedling rot and root necrosis of *Allium cepa*.

Abstr. in *Phytopathology*, 1948, 38: 29.

Symptoms of *Pythium* parasitism in onions are seed rotting, pre-emergence seedling rot, stunted emerged seedlings which often die, seedling damping-off, and lead-coloured or faintly brown, yellowish or pink roots lacking cortex in advanced stages of disease. Pink root rot of onion in Iowa is primarily a *Pythium* root necrosis accompanied by *Fusarium* and *Phoma terrestris*.

1098. LHOISTE, J., AND RAVAUULT, L. 635.25: 632.954
De l'action des désherbants chimiques sur les *Allium* cultivés. (The effect of chemical weed-killers on cultivated *Allium* species.)
C.R. Acad. Agric. Fr., 1947, 33: 519-22, bibl. 10.

An account of a trial on plots of leek (*Allium porrum*) and onion (*A. cepa*). Growth-promoting substances should be avoided for the control of weeds in these crops; they cause malformation of the crop plants, and kill some of them. Of selective weedkillers dinitroresol ammonium salt is not outstanding, while potassium ethylxanthate (from 1 to 2%) gave better results than sulphuric acid.

1099. JARY, S. G., ROLFE, S. W. H., AND CARPENTER, K. 635.261: 632.78

The leek moth.

Agriculture, 1948, 54: 563-9.

An account of trials in which different forms of DDT,

benzene hexachloride and nicotine were used. The conclusion was reached that a high degree of control could be achieved by applying DDT dust or spray at the first sign of damage and repeating the application at intervals of 2 to 3 weeks. The other chemicals proved less successful.

1100. THOMPSON, R. C. 635.31
Asparagus culture.

Fmrs' Bull. U.S. Dep. Agric. 1646, 1947, pp. 26.

This is a complete guide for small or large scale production of asparagus, from sowing the seed to shipping the bunches. The plant requires a period of dormancy, and in parts of California this is induced by withholding irrigation water during the dry season, when there is insufficient cold to check growth. One-year-old crowns of varieties resistant to rust are recommended for planting. Although male plants give a higher yield than female, it is not profitable to defer planting until the sex of the crowns is known.

1101. DEPARDON, I., AND BURON, P. 635.31: 631.8
La fumure de l'asperge. (Manuring asparagus.)
Ann. agron. Paris, 1947, 17: 667-73, bibl. 3, and
C.R. Acad. Agric. Fr., 1947, 33: 713-16.

For the maintenance of asparagus in neutral sandy soils deficient in lime, the authors recommend an annual application of 10,000 kg. farmyard manure, 400-450 kg. nitrate of lime (13%), and 150 kg. KCl per hectare.—Station Agronomique de Blois.

1102. GALSTON, A. W. 635.31: 581.144.2
Nutritional requirements for root initiation in excised asparagus stem tips.
Abstr. in *Amer. J. Bot.*, 1947, 34: 599-600.

Asparagus stem tips were cultured on a medium consisting of sucrose and mineral salts. These tips root in the presence of indoleacetic acid (IAA) in the dark, but not under light of 500 f.c.; this response is not shown after several months of sub-culture in the dark, but it may be restored if the culture is illuminated for one week in the absence of IAA. This anomalous behaviour is ascribed to rhizocaline; IAA induces rooting in its presence and stem growth in its absence.—California Institute of Technology, Pasadena, Calif.

1103. DORAN, W. L. 635.34: 632.4
Fungicides applied in fertilizer for the control of cabbage clubroot and damping off.
Abstr. in *Phytopathology*, 1947, 37: 848.

Fungicides were mixed with a 5 : 8 : 7 commercial fertilizer and applied to soil at the rate of 15-6 g. of the fertilizer per square foot immediately before seeding. Dithane D-14 (disodium ethylene bisdithiocarbamate) and Dow Seed Protectant No. 9 (zinc trichlorophenate) thus applied controlled damping-off better or with less injury than when applied in water immediately after seeding. Tuads (tetramethyl thiuram disulphide) at 0.55 g. per sq. foot, applied in fertilizer, gave good control of clubroot and of damping-off and markedly improved the growth of cabbage seedlings in both limed and unlimed soils.

1104. FOSTER, H. H. 635.34: 632.4
The control of cabbage downy mildew through the use of sprays.
Phytopathology, 1947, 37: 712-20, bibl. 7.

Spergon (wetable) at 4 lb. to 100 gal. and Dow Seed Protectant No. 5 at 2 lb. per 100 gal. gave practical control in greenhouse and plant beds when applied twice a week against cabbage downy mildew (*Peronospora parasitica*).

1105. FOSTER, H. H., AND PINCKARD, J. A. 635.34: 632.4

Control of cabbage downy mildew with benzene vapor.

Phytopathology, 1947, 37: 896-911, bibl. 13.

Benzene is effective against cabbage downy mildew (*Peronospora parasitica*) at the rate of 50 c.c. per sq. yard when

applied on five successive nights per week under a wet muslin cover of 48×44 thread count, when applied in advance of sporulation and continued to within a few weeks of field planting.

1106. WARNE, L. G. G. 635.34/36
Three annual brassicae of value for spring "greens".

Gdnrs' Chron., 1948, 123: 84, bibl. 3.

In climates where kales, broccoli and spring cabbage are liable to be killed by the winter, greens may be short in the late spring. Tendergreen or spinach mustard, *Brassica perviridis*, Shogoin turnip and Seven Top turnip may be sown early in spring and harvested in about eight weeks.—University of Manchester.

1107. WARING, E. J., SHIRLOW, N. S., AND WILSON, R. D. 635.35: 632.19: 546.77
Molybdenum in relation to whiptail of cauliflower. *J. Aust. Inst. Agric. Sci.*, 1947, 13: 187-8, bibl. 5.

A note on an experiment from which it appears that 1 lb. of sodium molybdate per acre was adequate to prevent all except a trace of whiptail on land which had been treated with sulphur, whereas $\frac{1}{2}$ lb. of sodium molybdate per acre was inadequate. The results obtained confirm the earlier work regarding whiptail and soil acidity, and also that of Mitchell in New Zealand concerning molybdenum. It would appear that the relationship of soil acidity to whiptail of cauliflowers, as suggested by Davis, depends on the fact that the availability of molybdenum decreases as soil acidity increases. [From authors' conclusions.]—Dep. of Agric., Sydney, N.S.W.

1108. COUTURIER, A. 635.35: 632.76
Biologie de *Baris laticollis* Marsh, et moyens de lutte en Alsace. (Biology of *Baris laticollis* and its control in Alsace.) *C.R. Acad. Agric. Fr.*, 1948, 34: 92-3.

A severe attack on cauliflowers by this weevil in the spring of 1947 is reported. The larvae mined the stalks and reached the heart of the curd. The action of DDT on the adults is described in some detail. The weevils rarely fly and cannot penetrate more than 3 cm. into the soil, so that soil treatment with DDT is recommended.

1109. (DIVISION OF PLANT INDUSTRY, N.S.W.) 635.356
The growing of sprouting broccoli. *Agric. Gaz. N.S.W.*, 1947, 58: 600-2.

Cultural, harvesting and marketing operations; and diseases and pests are described.

1110. BAUD, C. 635.41
Epinard géant Cavallius. (Cavallius, a giant spinach.) *Rev. hort. suisse*, 1948, 21: 46-7.

Said to have arisen as a mutation in Denmark, Cavallius is a giant short-day spinach suitable for cultivation under glass; it may be grown at 5° C. and thrives at up to 20° C. It gives a very high yield.

1111. SEVERIN, H. H. P., AND LITTLE, D. H. 635.41: 632.8

Spinach yellow dwarf.

Hilgardia, 1947, 17: 555-66, bibl. 15, illus.

The symptoms of yellow dwarf on naturally and experimentally infected spinach are described. The host range of this virus is limited to spinach. Some of the properties of the virus are summarized. The green peach aphid, *Myzus persicae* (Sulzer), was shown to be a vector.

1112. COOK, H. T., AND OTHERS. 635.41: 632.48
Fusarium wilt of spinach and the development of a wilt resistant variety. *Bull. Va Truck Exp. Stat.* 110, 1947, pp. 11, bibl. 6.

Selection in Virginia Savoy spinach has produced a strain so resistant that 70% survive on infested fields where only 30% of commercial strains survive.

1113. CHODAT, F., AND GAGNEBIN, F. 635.52
L'amélioration de la laitue pommée du Cazard. (Improving the Cazard cabbage lettuce.) *Rev. hort. suisse*, 1948, 21: 32-7, 58-61, bibl. 13.

At least three factors affect hearting in the lettuce—soil, photoperiod, and heredity. To distinguish lettuces homozygous for hearting seed must be sown in short days, from October to February. Lettuces homozygous for the short-day habit can only be recognized by sowings made after the beginning of May. Those that are homozygous for both characters will heart whether grown in short or in long days.—University of Geneva.

1114. WITTWER, S. H., COULTER, L. L., AND CAROLUS, R. L. 635.53: 577.17
A chemical control of seedstalk development in celery. *Science*, 1947, 106: 590, bibl. 4, being *J. Agr. Mich. agric. Exp. Stat.* 913.

Celery seedlings were induced to bolt by exposure to temperatures below 43° F. for 50 nights; 77 days later all plants had flowered except those sprayed with 100 p.p.m. of α -o-chlorophenoxypropionic acid before the chilling process.

1115. WILSON, K. S. 635.61: 577.16
Vitamin patterns in the development of cucurbit fruits. *Amer. J. Bot.*, 1947, 34: 469-83, bibl. 13.

Determinations of thiamin, riboflavin and niacin were made in various parts of the developing fruits of twelve races of the species *Cucurbita pepo*, *C. maxima* and *Lagenaria vulgaris*. Vitamin levels were high during the early stages of cell multiplication, and fell during cell expansion; vitamin concentration may help to determine fruit size. Associated with seed production and development thiamin concentration increased in the placental region; this increase was less marked in tetraploids, which produced fewer seeds than diploids.—Yale.

1116. HOPE, R., AND GILES, J. E. 635.61
Rock-melon variety trials in the Mildura district. *J. Dep. Agric. Vict.*, 1947, 45: 557-60, illus.

The data obtained from the trials are tabulated. They indicate the superiority of the Hale's Best types. One of them, the variety Mildew Resistant, obtained highest points and it is apparent that concentration on this strain will result in an improvement in rock-melon growing in the Mildura district.

1117. ANON. 635.61
The Zucca melon. *Canad. Gr.*, 1948, 71: 2: 22-3.

This large gourd from Sicily now forms the raw material of an artificial fruit industry in North America, where its flesh is coloured and flavoured artificially.

1118. RADER, W. E., FITZPATRICK, H. F., AND HILDEBRAND, E. M. 635.611: 632.8
A seed-borne virus of muskmelon. *Phytopathology*, 1947, 37: 809-16, bibl. 8.

The symptoms of a disease of muskmelon caused by a new virus are veinbanding and distortion of the young leaves, with mottling of the leaves subsequently formed. The name *Marmor melonis* sp. nov. is proposed.—Cornell University, Ithaca, New York.

1119. WHITAKER, T. W., AND PRYOR, D. E. 635.61: 632.4

Correlated resistance of leaves, cotyledons, and stems of *Cucumis melo* L. to cantaloupe powdery mildew (*Erysiphe cichoracearum* DC.). *Phytopathology*, 1947, 37: 865-7.

There is usually a close correlation between the severity of powdery mildew symptoms on the leaves, cotyledons and stems of the same plant. There appears to be only one biotype of the powdery mildew.

1120. STODDARD, D. L. 635.611: 632.48: 631.8
Nitrogen, potassium, and calcium in relation to Fusarium wilt of muskmelon.
Phytopathology, 1947, 37: 875-84, bibl. 18.
High levels of nitrogen cause greater invasion of muskmelon plants by *Fusarium bulbigenum* var. *niveum* f.2 and a larger number of plants killed. Potassium appears to be unimportant in affecting susceptibility when nitrogen and potassium are balanced and sufficient for normal growth of the plant. The addition of sufficient lime to the soil to raise the soil pH to 6-0 reduced the amount of disease in field plots.
1121. CHIN, W. F. 635.61: 632.4
The pathogenicity of *Mycosphaerella citrullina*.
Abstr. in *Phytopathology*, 1948, 38: 5.
Observations on muskmelon, watermelon, cucumber and squash. In field experiments Improved Kleckley Sweet watermelon was much more resistant than Hawkesbury, and Cubit cucumber was highly resistant, compared with a number of other varieties.
1122. CARRUTH, L. A., AND HERVEY, G. E. R. 635.62
DDT and other insecticides for squash borer control.
J. econ. Ent., 1947, 40: 716-21, bibl. 6, being
J. Pap. N. York St. agric. Exp. Stat. 695.
Differences in the toxicity of DDT to cucurbits depend on variety and also on the melting point of the DDT preparation used. DDT of m.p. 90° C. was more damaging than that of m.p. 103-105° C. Plants of Dickinson pumpkin and Butter-nut squash appear to be resistant to infestation by the squash borer *Melittia cucurbitae*.
1123. EPPS, W. M. 635.63
New cucumber for south.
Market Gr. J., 1948, 77: 4: 27, 57.
Palmetta is a cucumber variety resistant to downy mildew, suitable for growing in South Carolina as a late crop.
1124. NIENOW, I. 632.8: 635.1/7
The identification and characterization of a virus causing mosaic in *Mertensia virginica* [the Virginian cowslip].
Phytopathology, 1948, 38: 62-9, bibl. 16.
The virus causing mosaic in *Mertensia virginica*, identified as *Cucumis virus I* Smith, is transmissible to a large number of plants including cucumber, tomato, tobacco, by the vector *Myzus persicae* Sulzer. *Mertensia virginica* being perennial provides an important reservoir for the virus.
1125. KOHLER, G. W., AND OTHERS. 635.64: 577.16
Selection and breeding for high β -carotene content (provitamin A) in tomato.
Bot. Gaz., 1947, 109: 219-25, bibl. 2, being
J. Pap. Purdue Univ. agric. Exp. Stat. 286.
From a cross involving *Lycopersicon hirsutum* selections bearing large fruits rich in β -carotene have been obtained. As the total carotenoid concentration has not been increased, the β -carotene appears to be produced at the expense of lycopene.
1126. GUSTAFSON, F. G. 635.64: 577.16
Distribution of thiamin and riboflavin in the tomato plant.
Plant Physiol., 1947, 22: 620-6, bibl. 10, being
Pap. Dep. Bot. Univ. Mich. 846.
Plant material—John Baer tomato grown in the greenhouse. The concentration of thiamin and riboflavin is highest in the immature leaves and stem. The blade of the mature leaf contains more of these vitamins than does the ripe fruit.
1127. YOUNG, P. A. 635.64
Hereditary defects in tomatoes.
Abstr. in *Phytopathology*, 1948, 38: 29.
Inherited susceptibility to physiological abnormalities occurred in tomato varieties with high percentages of leaf roll, fruit puffing, blossom-end knobs, cuticle cracks, blossom-end rot and catface. A mutant tomato had extremely puffed fruits resembling bell peppers.
1128. CHOUARD, P., GUEDRON, P., AND MARISCAL, R. 635.64
Nouveaux essais préliminaires sur la normalisation de la culture et des variétés de tomates.
(The standardization of tomato varieties.)
C.R. Acad. Agric. Fr., 1947, 33: 523-6.
A study of 82 new varieties of tomato relative to (a) best time for sowing the seed, (b) yield per plant, (c) shape and structure of fruit, (d) the ratio dry weight : fresh weight, (e) sugar and vitamin C content, (f) number of seeds, (g) amount of skin, (h) variation of the constituents with the degree of ripeness and the time of ripening.
1129. PORTE, W. S., AND ANDRUS, C. F. 635.64
Healthier tomatoes.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 312-19, bibl. 8.
A short history of breeding disease-resistant tomatoes in the U.S.A., begun in 1915, is followed by a description of the aims and scope of current work on the problem.
1130. HARPER, R. S. 635.64
"Tatinter", a new Victorian tomato suitable for processing and marketing.
J. Dep. Agric. Vict., 1947, 45: 519-24, illus.
This new variety played an important part in the expansion of tomato production in Victoria during the war period to meet the heavy demand by the fighting forces. The plant and its fruit are described in detail. Seed was released for district planting in July, 1944.
1131. ALLEGAERT, E. 635.64
Kan onze tomatenteelt nog opgevoerd worden ?
(Can tomato culture be improved ?)
Cultuur Hand., 1947, 13: 5: 20-1.
Earthing-up tomato plants is advocated among other cultural operations in Belgium, in order to induce a more extensive root system and thus more vigorous plants, particularly towards the end of the season. The seedlings were protected under glass until after the middle of May; the first earthing was carried out towards the end of May, the second early in June.
1132. QUINN, N. R. 635.64: 631.544
Glasshouse tomato culture.
J. Dep. Agric. S. Aust., 1947, 51: 169-73, 224-7, illus.
Notes on glasshouse construction, preparing the soil, artificial manuring, planting, cultural practices, ventilation and low-temperature control. Probably 95% of the tomatoes grown in glasshouses in South Australia are the S.A. Dwarf Red variety.
1133. MARSHALL, E. R., AND STAIR, E. C. 635.64
Effect of containers upon the growth of tomato transplants.
Market Gr. J., 1948, 77: 3: 7, 34, 36, bibl. 4.
Tests with 16 types of container indicated that the very marked effect on the growth of tomato seedlings is due to differences in the moisture-retaining capacity, the decomposable cellulose, and the volume, of the container. Tin cans and jam jars produced good plants, but transplanting from them was more difficult. Black clay pots produced better plants than did untreated pots. Not all commercial containers produced good plants.—Purdue University.
1134. WILSON, C. C. 635.64: 612.014.44
Diurnal fluctuations of growth in length of tomato stem.
Plant Physiol., 1948, 23: 156-7, bibl. 3.
Auxanometers attached to 6-week-old tomato plants

growing in moist soil showed that the length of stem below the topmost node decreases by day and increases by night; above the first node the tip grows continuously, and most rapidly between 10 a.m. and 2 p.m.—University of Georgia.

1135. KING, G. N. 635.64: 581.163
Artificial parthenocarp in *Lycopersicon esculentum*; tissue development.
Plant Physiol., 1947, 22: 572-81, bibl. 23.

Parthenocarpic fruits were produced by applying 0-5% indolebutyric acid in lanolin to stigma, style, or ovary of Marglobe tomatoes grown in a greenhouse at 70°-85° F. Histological studies showed that the embryo sac of the developing ovules collapsed after treatment, and the placental tissue eventually filled the seedless parthenocarpic fruit. Secondary tissue was responsible for thickened pedicel of these fruits. Parthenocarpic fruits were as large as normal fruit, and the yield of treated plants as great as that of untreated plants.—Miami University, Oxford, Ohio.

1136. MILLER, E. V., AND SCHOMER, H. A. 635.64: 581.035
The effect of ultraviolet light on subsequent ripening of the fruit of the tomato (*Lycopersicon esculentum*).
Plant Physiol., 1947, 22: 608-12, bibl. 4.

Mature green tomatoes were exposed to ultraviolet irradiation for up to 5 hours; some were then treated with ethylene to hasten ripening. Irradiation retarded the loss of chlorophyll, the development of carotenoid pigments, and the reduction of acidity. The effect of sunlight on the pigments of the ripening orange is also discussed.—U.S. Horticultural Field Laboratory, Orlando, Fla.

1137. SMITH, G. E., AND HESTER, J. B. 631.416.7: 635.1/7
Calcium content of soils and fertilizers in relation to composition and nutritive value of plants.
Soil Sci., 1948, 65: 117-28, bibl. 24.

Data of horticultural interest in this review include the following: Raising the calcium content of the soil when other elements were deficient did not produce tomatoes of good quality. The changes in tomato puree are shown when calcium and magnesium limestone were added to an acid soil that received liberal quantities of other nutrients. In factorial pot experiments using tomatoes, spinach, and oats with four nitrogen, four manganese, and two potassium levels, the influence of increasing amounts of one element on the formation of vitamin C is dependent on the level of other nutrients.

1138. CLARK, F. E. 631.847: 635.64
Azotobacter inoculation of crops: III. Recovery of azotobacter from the rhizosphere.
Soil Sci., 1948, 65: 193-202, bibl. 16.

Suspensions of *Azotobacter chroococcum* and *A. vinelandii* were applied to tomato seedlings at time of transplanting to (a) soil initially free of the organisms and (b) soil normally containing them. In both soils there was a rapid decline in numbers. The disappearance of added azotobacter was found to be less rapid in uncropped than in cropped soil.

1139. HEMPHILL, D. D., AND MURNEEK, A. E. 635.64
More tomatoes per stem.
Market Gr. J., 1948, 77: 4: 5, 31-2.

Two modifications of single stem pruning of tomatoes were tried: below each of the first and second clusters one, or two, side shoots were not removed but were topped when each had produced two leaves. In the field Master Marglobe plants so pruned produced 12-1% more tomatoes, when two side shoots were retained, and 13-5% more when four were retained, than the single stem controls. With similar treatment the variety Break o' Day gave increases of 32-1% and 37-1% when grown in the greenhouse during winter.—Missouri Agric. Exp. Stat., Columbia.

1140. BLOOD, H. L. 635.64: 632.3/4 + 632.8
Disease problems of tomato plants in the Moapa Valley, Nevada.
Market Gr. J., 1948, 77: 3: 5, 40-2, 44, 46.

In Nevada tomato seedlings are raised for commercial planting in other States. Recommendations are made for the avoidance of disease in this specialized culture.—U.S.D.A.

1141. DIOTALLEVI, Z., GOIDANICH, G., AND MARIM-PIETRI, L. 635.64: 632.19
Il "marciume apicale" del pomodoro "San Marzano". (Blossom-end rot of the San Marzano tomato.)
Ital. agric., 1947, 84: 637-43.

This physiological disease, which is well known in most tomato growing areas, causes great havoc in a popular Italian variety. Observations on its incidence confirm the fact already established elsewhere that the chief cause is irregularity of water supply.

1142. NORRIS, D. O. 635.64: 632.8
The strain complex and symptom variability of tomato spotted wilt virus.
Bull. Coun. sci. industr. Res. Aust. 202, 1946, 51 pp., bibl. 37, illus.

The spotted wilt virus consists of a complex of at least five closely related strains varying in severity of reaction on tomato from terminal necrosis to barely distinguishable mottle. The symptoms of these strains on 16 host species are described in detail. The great variability of spotted wilt symptoms is due largely to variation in the ratio of the strains. The tomato is an excellent medium for the multiplication of the severe strains and it is postulated that the sudden appearance of the spotted wilt disease was due to the association with tomato of a virus which existed previously in the mild form. *Lycopersicon peruvianum* possesses true resistance amounting almost to immunity. The relation of this fact and of the demonstration of strains of the virus to the problem of breeding for resistance is discussed. [From author's summary.]

1143. HUTTON, E. M., AND WARK, D. C. 635.64: 632.8
Tomato big bud.
J. Aust. Inst. agric. Sci., 1947, 13: 188-90, bibl. 1, illus.

A note on a survey of the incidence of the virus disease big bud in tomato plots. The lack of variation in the physiological response to big bud in the material examined seems to indicate that resistant lines for use in developing varieties resistant to the disease will be difficult to find. At present the use of DDT or similar sprays timed to coincide with the flights of the leafhopper vector offers better chances of control.—Div. of Plant Industry, C.S.I.R., Australia.

1144. COOK, H. T. 633.491 + 635.64: 632.411
Our method for forecasting tomato late blight.
Reprinted from the *Food Packer*, April, 1947, 2 pp.

The method developed for Eastern Virginia is based on the occurrence of late blight in relation to the temperature and rainfall in May, June and July in that area during the last 17 years. The relationship of the weather to blight and the method of making the forecasts is shown in five figures. Spraying or dusting will be recommended after there have been two consecutive weeks in May when both temperature and rainfall have been favourable for blight. Recommendations to cease spraying will not be made until there have been two consecutive weeks in which either temperature and/or rainfall have been unfavourable.

1145. BAKER, K. F. 635.6: 632.4
Seed transmission of *Rhizoctonia solani* in relation to control of seedling damping-off.
Phytopathology, 1947, 37: 912-23, bibl. 26.

Seed transmission of *Rhizoctonia solani* was demonstrated in bell and chili pepper, egg-plant, tomato and zinnia. Hot-water treatment of pepper, egg-plant, or zinnia seed at 51-7°C. (125°F.) for 30 minutes killed the fungus in and on the seed without significantly reducing germination.

1146. HUTTON, E. M., MILLS, M., AND GILES, J. E.

635.64: 632.48

Fusarium wilt of tomato in Australia. 2. Inheritance of field immunity to Fusarium wilt in the tomato (*Lycopersicon esculentum*).

J. Coun. sci. industr. Res. Aust., 1947, 20: 468-74, bibl. 3.

It is shown that the variety Pan America is a suitable parent for introducing field immunity to *Fusarium* wilt into new tomato hybrids suited to Australian conditions. The use of this variety in some crosses leads to an improvement in vitamin C content.

1147. ROBINSON, W. B., AND OTHERS.

635.64: 577.16: 632.952

Relation of copper-containing fungicides to the ascorbic acid and copper content of tomato juice.

Bull. N. York St. Agric. Exp. Stat. 725, 1947, pp. 18, bibl. 25.

When tomato plants are sprayed with fungicides containing copper, traces of that element migrate to the fruit. During processing copper has a detrimental effect on the ascorbic acid content of the juice, but no effect on its colour or flavour could be observed.

1148. SCHROEDER, W. T., AND SMITH, F. G.

635.64: 632.95

Some problems involved in use of 2,4-D as a tomato defoliant.

Abstr. in Phytopathology, 1947, 37: 849.

2,4-D reduces the cracking of tomatoes during very wet periods. The amount of cracking is inversely proportional to the extent of defoliation or vine damage which is caused by 2,4-D and depends on its time of application. Processed juice from treated fruit was inferior in flavour and colour. The applications caused lower yields, probably by reducing fruit size, but in very wet seasons control of cracking and the resulting fruit mould might offset this reduction in yield.

1149. ATKINSON, J. D.

635.64: 632.954

Tomatoes injured by hormone weedkillers.

N.Z. J. Agric., 1947, 75: 349-51, bibl. 3, illus.

Damage to tomato plants by 2,4-D used as a weedkiller is described and illustrated. When a tomato plant receives the spray at weedkilling strength it starts to droop within a few hours. Translucent spots develop on some leaflets and these soon die. Brown necrotic blisters appear on the stem. Leaf stalks curl downward, while leaflet edges roll up. Twenty-four hours after treatment the plants are markedly twisted and beginning to wilt, and nine days later they are dead.

1150. KLEIN, H. Z.

635.64: 632.754

Notes on the green leafhopper, *Empoasca lybica*, Berg. (Hom. Jassid.) in Palestine.

Bull. ent. Res., 1948, 38: 579-84, bibl. 7.

The green leafhopper may cause severe damage to young egg-plants and tomatoes in Palestine. No satisfactory control measure has been devised.—Rehovot.

1151. DE OLIVEIRA, A. J.

635.65(469)

Subsídios para o estudo de algumas formas cultivadas do feijão vulgar. (Cultivated forms of French beans.)

Rev. agron., Lisbon, 1943, 31: 43-75, bibl. 41 [received 1948].

In the Portuguese province of Minho and the lower Douro basin, with particular reference to the external characters of the seeds.

1152. KUHN, W. F.

635.65

Growing fresh Chinese bean sprouts.

Fruit Prod. J., 1948, 27: 144-5, 157.

Describes an automatic irrigation system for sprouting Mung beans commercially. One pound of seed will produce 6 to 8 lb. of sprouts in 5 to 7 days.

1153. HUBBELING, N.

635.65: 632.3/4+632.8

Vatbaarheid van stamslaboonenrassen voor ziekten welke met het zaaizaad overgaan. (Susceptibility to seedborne diseases of dwarf French beans.)

Meded. Inst. Vered. Tuinbgew. Wageningen 1, 1946, 9 pp., bibl. 10.

Observations on the relative susceptibility of dwarf bean varieties to common bean mosaic, halo blight, anthracnose and pod spot.

1154. SMITH, F. G.

635.65: 577.17

The effect of 2,4-dichlorophenoxyacetic acid on the respiratory metabolism of bean stem tissue.

Plant Physiol., 1948, 23: 70-83, bibl. 34, being *J. Pap. N. York agric. Exp. Stat.* 718.

Slices of stem from California Red Kidney bean seedlings were used in investigations, which included the effect of 2,4-D on slices *in vitro*, and its effect on respiration, composition and histology when applied to the intact plant. The action of inhibitors and substrates was observed.

1155. FELBER, I. M., AND LUCAS, E. H.

635.65: 577.17

Evaluation of growth responses resulting from internal and surface applications of 2,4-D to [Red Kidney] bean plants.

Quart. Bull. Mich. agric. Exp. Stat., 1947, 30: 170-9, bibl. 10.

1. The effectiveness of internal and external treatment with 2,4-D solutions was compared. The direct introduction of the test substance into plant tissue by thread and needle gave better results with regard to uniformity and specificity of growth responses than surface application by means of a drop. 2. A method of evaluation is presented which uses the amount of fresh weight produced by terminal growth, lateral growth and tumors, subsequent to treatments with 2,4-D solutions, as an index of correlative growth responses in bean plants. It makes it possible to express simultaneously quantitative and qualitative changes of growth, thereby relating specific substances to form phenomena. [Authors' summary.]

1156. ZAUMEYER, W. J.

635.65: 632.4+632.8

Control of bean diseases [in U.S.A.].

Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 333-7, bibl. 6.

An account of breeding for disease resistance and the successful use of sulphur dust against bean rust (*Uromyces phaseoli typica*). The new rust-resistant varieties Pinto No. 5 and No. 14, developed by the U.S.D.A., became available to growers in 1946. These varieties are also tolerant to common bean mosaic and to bacterial, or halo, blight (*Pseudomonas phaseolicola*). Short notes are given on other new disease-resistant varieties.

1157. MILES, M.

635.65: 632.77

Field observations on the bean seed fly (seed corn maggot), *Chortophila cilicrura*, Rond., and *C. trichodactyla*, Rond.

Bull. ent. Res., 1948, 38: 559-74, bibl. 28.

After describing her observations on these pests, the author suggests these control measures. Beans.—The seed bed should be prepared a month before sowing; a repellent such as naphthalene should be applied after the first cultivation. Spring cabbages.—The roots should be dipped in a paste of calomel dust and water before planting.—Long Ashton Research Station.

1158. HAWKINS, J. H. 635.65: 632.76
The Mexican bean beetle in Maine.
Bull. Me agric. Exp. Sta. 431, 1944, pp. 205-31,
bibl. 5, illus. [received 1948].

An account of the Mexican bean beetle [*Epilachna varivestis*], its biology and life history, the damage it causes, host plants, control measures, and machines for applying insecticides. Formulae for the preparation of arsenical dusts and sprays and rotenone dusts are given.

1159. HEINZE, P. H., HAYDEN, F. R., AND WADE, B. L. 635.656: 577.17
Vitamin studies of varieties and strains of peas.
Plant Physiol., 1947, 22: 548-60, bibl. 12.

The authors analysed garden peas of a number of varieties and strains for thiamine, riboflavin, ascorbic acid and carotene over several seasons; significant varietal differences were found for all these vitamins. Differences in the thiamine content are large enough to be of importance in diet, and the breeder attempting to improve the nutritive value of peas should pay attention to this vitamin.—U.S. Regional Vegetable Breeding Laboratory, Charleston, S.C.

1160. PICKETT, B. S. 635.67
Sweet corn tests in the lower Rio Grande valley.
Bull. Tex. agric. Exp. Stat. 689, 1947, pp. 13,
bibl. 4, illus.

The results of spacing and variety trials and of earworm-resistance [*Heliothis armigera*] studies are presented. A concentration of 11,000 to 13,000 plants per acre appears best. The following new varieties of yellow sweet corn are well adapted to the valley: Erie, Bantam Hybrids 56 and 57. Certain promising varieties are also listed. Observations suggest that hereditary characters alone may not account for observed resistance to earworm.

1161. (SINGLETON, W. R.) 635.67
New sweet corn hybrid announced by Connecticut.
Market Gr. J., 1948, 77: 3: 29.

Grant, a midsummer sweet corn hybrid, has been released by the Connecticut Agricultural Experiment Station. It is resistant to bacterial wilt.

1162. (ANDREW, R. H.) 635.67
New Wisconsin hybrid [sweet corn].
Market Gr. J., 1948, 77: 3: 23.

Wisconsin Golden 800 is an 8-row strain similar to Golden Bantam. It has a high degree of cold resistance in the spring. Some small samples are available for trial.—Agronomy Dep., University of Wisconsin.

1163. HAMNER, C. L., TUKEY, H. B., AND CARLSON, R. F. 635.67: 632.954
Application of 2,4-dichlorophenoxyacetic acid to soil as a pre-emergence spray to prevent lodging and to control weeds in sweet corn.
Quart. Bull. Mich. agric. Exp. Stat., 1947, 30: 194-200, bibl. 9.

When the sodium salt of 2,4-D was applied as a ground spray at 5 lb. per acre immediately after sowing sweet corn, weeds were controlled to such a degree that cultivation was unnecessary. The chemical also stimulated the initiation and development of additional "prop" roots, which enabled plants in treated soil to withstand wind that lodged plants in the control plots.

1164. BELS, P. J. 635.8(492)
Champignonsteelt in Nederland van 1942 tot 1946.
(Mushroom culture in Holland from 1942 to 1946.) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, 10: 531-46, bibl. 28.

During the period 1942 to 1946 mushrooms were cultivated in Holland by about 25 growers; 12 worked in subterranean quarries, the others in more or less modern mushroom houses, or in cellars and sheds. In those years the total output was about 400,000 lb., about half being from the

quarries. The yield in the quarries was about 40 lb. per ton of manure used; in the houses, cellars and sheds about 80 lb. Improvement in Dutch mushroom growing can be obtained only by introducing modern methods, but it will be difficult to change the methods employed in the quarries.

Glasshouse crops.*

1165. YEO, M. L. 631.362.7: 632.111.3: 631.544
Fuel utilization in agriculture and horticulture.
Mon. Bull. Brit. Coal Util. Res. Ass., 1947, 11: 505-21, bibl. 11, illus.

This is a useful survey of present knowledge. Horticultural practice is summarized under the following headings. *Hop drying*—by solid fuel, oil and, recently, producer gas. *Glasshouse heating*—hot water systems with solid or oil fuel, temperature thermostatically controlled; steam system either erected for the purpose or as a by-product of, say, a power station; electrical system, not yet commercially economical, though good where cost is not a primary consideration; fuel economy measures, satisfactory methods have yet to be devised and will presumably include the utilization of waste gases and better conservation of heat, which is extremely apt to escape through the roof at night. Experiments at the National Institute of Agricultural Engineering are noted, in which aluminium roller blinds are used to check this. *Soil sterilization*—a note that this is fully dealt with in Bulletin 22 of the Ministry of Agriculture [see abstr. 1167]. *Soil warming*—among methods touched on are running hot water pipes through the soil, the water being heated by separate boiler or produced as a by-product from power stations, and the use of electricity in frames and under cloches. *Orchard heating*—apparatus noted include coke and oil heaters, infra-red heating units and jet propulsion engines for the production of hot gases.

1166. GAMBLE, W. H. 631.544
Comparing glasshouse fuel costs [in Britain].
Grower, 1948, 29: 57.

The present cost of heating a glasshouse of approximately 4,000 cu. ft. over a heating season of about 2,000 hours is calculated as: £12 per annum for a coke-fired boiler, with coke at £4 a ton; £12 p.a. for an anthracite-fired boiler, with anthracite at £5 a ton; £12 p.a. for gas-fired boilers, with gas at 4d. per therm; and £66 p.a. for electric heating, with current at 1d. a unit.

1167. (BEWLEY, W. F., AND OTHERS.) 631.462: 631.544
Practical sterilization with special reference to glasshouse crops.
Bull. Minist. Agric. Lond. 22, 4th edit., 1947, pp. 22, illus., 1s. 3d.

This revised bulletin, compiled by a small expert committee, should be extremely useful both to the old stager and to the newcomer to glasshouse work. Most of the information is on "sterilization" by steaming, and the most important systems both for large and small scale operations used in this country are considered in detail with the help of clear illustrations. Other methods are also discussed, namely baking, which can be useful on a small scale if carefully operated; electrical treatment, on which work was carried on before the war; and the application of the following chemicals—formaldehyde, cresylic acid, carbon disulphide. The treatment of the soil after sterilization and before planting up also receives attention—thus after steaming flooding is essential—though for what reason is not known—and in applying manures due attention must be paid to the type of treatment given and its effect on the liberation of plant nutrients. Finally 14 practical points to remember are stressed.

1168. JACKS, H. 631.462
Sterilizing the glasshouse soil by using steam.
Orchard. N.Z., 1947, 20: 5: 5.

The system described consists of a number of single or

* See also 1132, 1524.

double pipes which are laid in position separately and joined to the steam hose by flexible tubes. A diagram shows a useful layout for such apparatus and all necessary information can be derived from it.

1169. RIBOT, G. 631.462
La stérilisation du sol par la vapeur d'eau.
(Steam sterilization of soils.)
Courr. hort., 1948, 10: 38.

The author describes with illustration a portable boiler that can be used for steam sterilizing soil, and outlines its manipulation. It may be used in the open ground for beds, for seed boxes or for soil in trucks.

1170. (DEARBORN, C. H.) 632.111: 631.544
Prevention of frost in cold frames.
Market Gr. J., 1948, 77: 3: 29.

By spraying cold water on the glass, frost was prevented in cold frames when the temperature outside registered 12° F. A well-distributed flow of 5 gallons of water per hour per sash is stated to give more protection than a double layer of bamboo mats.—New York State Agric. Exp. Stat., Geneva.

1171. RAPLEY, W. 631.332.1
Making a little glass go a long way.
Nurseryman and Seedsman, 1948, Feb. 12, pp. 2.

A description of a patented transplanting tool, by which a cylinder of soil 2½ in. diameter and 3 in. deep can be withdrawn from the seed bed with little damage to the root system of the seedling removed in the operation.

1172. STARK, F. L., JR., AND LEAR, B. 631.544: 632.944
Miscellaneous greenhouse tests with various soil fumigants for the control of fungi and nematodes.
Phytopathology, 1947, 37: 698-711.

Soil fumigants were compared in greenhouse experiments with peas, tomatoes, squash or wheat as test plants. Chloropicrin was the most effective fungicide tested. DD mixture and methyl bromide solutions were also fungicidal, but only at considerably higher doses than are required for nematode control. Ethylene dibromide was the most efficient nematocide, followed by DD mixture, methyl bromide solutions, and chloropicrin in descending order of effectiveness. A lethal concentration of methyl bromide diffused through the soil and penetrated large intact nematode galls in 2 to 4 hours.—Cornell University, Ithaca, New York.

1173. HAMILTON, C. C. 632.654.2: 631.544
Azobenzene dusts to control red spiders on some greenhouse plants.
J. econ. Ent., 1947, 40: 733-5, bibl. 2, being
J. Pap. N.J. agric. Exp. Stat.

Azobenzene dusts give good local control of most spider mites when fumigation of the entire glasshouse is impossible. The following species were controlled:—*Tetranychus bimaculatus*, *Paratetranychus ilicis*, *Brevipalpus* sp., and *Hemitarsonemus latus*.

1174. HEY, G. L. 632.654.2: 631.544
Experiments with azobenzene smokes against glasshouse red spider.
Grower, 1948, 29: 547-51.

Azobenzene, applied as a smoke in the glasshouse, will destroy all eggs and 90% of adults of *Tetranychus telarius*, the glasshouse red spider. Used at the rate of 6½ g. per 100 cu. ft., the chemical only damaged young tomato seedlings where local high concentration of the smoke occurred.—Murphy Chemical Co. in Guernsey.

1175. (CHESHUNT EXPERIMENTAL STATION.) 631.544: 632.651.3
Root-knot eelworm in glasshouses.
Adv. Leaflet Minist. Agric. Lond. 307, 1948, pp. 4.

Symptoms, life history, prevention and control. Control

is difficult: the measures suggested include steam sterilization, use of peat as surface-rooting medium, and possibly soil injection with "DD" compound—a mixture of dichloropropylene and dichloropropane.

Potatoes.*

1176. (DEPARTMENT OF AGRICULTURE FOR SCOTLAND.) 633.491(411)
New Scottish potato varieties.
Scot. Agric., 1948, 27: 237.

In 1947 the Department registered three new varieties as approved varieties immune to wart disease. These are—*Craigs Royal*, a second early with tubers oval to long oval, parti-coloured pink, eyes shallow, flesh white; *Craigs Snow-White*, a main crop variety with tubers oval to kidney, skin white, eyes shallow, flesh white; and *Orion*, an early main crop, with tubers oval, slightly indented at heel end, skin white, flesh lemon.

1177. LEITCH, C. C. 633.491(931)
New Zealand's potato crop.
N.Z. J. Agric., 1947, 75: 489-96.

Twelve of the more important varieties of potatoes grown in New Zealand to-day are described and illustrated, with notes on cultural operations and diseases.

1178. STEVENSON, F. J., AND AKELEY, R. V. 633.491-1.523
Breeding healthy potatoes.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 327-32.

A short account of potato breeding in the U.S.A. which was organized as a national project in 1929, the work being carried out co-operatively by 35 State experiment stations and the U.S.D.A. In some of the new varieties the important objective for which they were bred has been reached. *Sebag*, *Empire*, *Placid*, *Virgil*, *Chenango*, and *Ashworth* are resistant to late blight; *Menominee*, *Ontario*, *Cayuga*, and *Seneca* are resistant to common scab; *Katahdin*, *Chippewa*, *Warba*, *Houma*, *Earlaine*, *Sebag*, *Red Warba*, *Mohawk* and *Menominee* are resistant to one or more virus diseases; and *Teton* is resistant to ring rot. The new varieties that have already been released have been a factor in increasing the yield of potatoes in the United States from a little more than 100 bushels an acre 25 years ago to about 150 bushels in 1945. The results indicate much greater possibilities in breeding.

1179. HUDSON, P. S. 633.491-1.523
The British Commonwealth Agricultural Bureaux's potato collection.
Food and Agric., 1948, 1: 271-3.

The wide scope of this collection is indicated and its value to the plant breeder is discussed.

1180. HAWKES, J. G. 633.491(8)
Some observations on South American potatoes.
Ann. appl. Biol., 1947, 34: 622-31.

An account is given of the origin of the Empire Potato Collection housed by the Commonwealth Agricultural Bureaux at Cambridge, where some 1,500 lines are maintained and where a study is being made of the properties of the potatoes and of methods of transmission of these properties from parent to offspring. The geographical distribution (with maps), taxonomy, chromosome numbers, disease and frost resistance, of indigenous American species are discussed. It is pointed out that the ultimate object of the potato breeder, in dealing with these wild species, is to make successful hybrids between the *tuberosa* forms and any species of value in other series.—School of Agriculture, Cambridge.

* See also 830.

1181. GOMES DO AMARAL, V. S. 633.491(469)
Distribuição das principais variedades de batata no país. (The distribution of the principal varieties of potato in Portugal.)
Bol. Junta nac. Frutas, Lisbon, 1947, 7: 269-86
The potato varieties grown in Portugal are mentioned and advice is given on those most suitable for each of the fifteen agricultural regions (shown on a map). It is recommended that the varieties Alma, Great Scot, Doon Star and Bronderlev be imported and that field experiments be carried out with Arran Pilot and Epicure.
 1182. (TUINBOUWVOORLICHTINGSDIENST.) 633.491(492)
Rassenproeven met zeer vroege en vroege aardappelen over 1942. (Variety trials of early and very early potatoes in 1942.)
Meded. Tuinbouwvoorlichtingsdienst, 43, 1946, 39 pp.
A description of Dutch trials with ten varieties, including tabulated data on yields, size of tubers, dry weight, specific gravity, protein content, vitamin C content, and cooking qualities.
 1183. ANON. 633.491-2.4
Trials of potatoes for immunity from wart disease.
Agriculture, 1948, 54: 574-5.
A description of 6 new varieties added to the list of those immune to wart disease.
 1184. BLACK, W. 633.491-1.521.6
Disease resistance in potatoes.
Farming, 1948, 2: 327-31, illus.
The author discusses what the tuber-bearing Solanums have to offer for use in breeding against some of the more important diseases and pests of the potato.—Scottish Plant Breeding Station, Corstorphine.
 1185. BAZAVLUK, V. JU. 633.491: 576.3
Heterogeneity of the cells in the somatic tissues of the potato. [Russian.]
Agrobiologija, 1946, No. 4, pp. 46-56, bibl. 15.
Describes and illustrates atypical somatic cells in potato shoots, particularly cells with two or three nuclei.
 1186. GOEDEWAAGEN, M. A. J., AND DE WILLIGEN, A. H. A. 633.491-1.415
Over de beworteling van verschillende aardappelrassen en de invloed, die de zuurgraad van de grond daarop uitoefent. (On the root development of different potato varieties and its relation to the acidity of the soil.)
Landbouwk. Tijdschr., 1947, 59: 504-10.
Root concentration 30 cm. from the plants showed large differences between varieties; these differences were not related to yield. In the range of pH used, from 4.55 to 6.3, the optimum for yield was from 4.9 to 6.3 according to variety; for root concentration the optimum was from 4.55 to 5.5. For each variety the two optima were associated.
 1187. RODRIGUEZ, L. C. 581.11: 633.491
Estudios de transpiración vegetal. (Transpiration studies.) [English summary 11 l.]
Anal. Inst. españ. Edafol. Ecol. Fisiol. veg., 1946, 5: 441-53, bibl. 4.
An account is given of the water requirements of late potatoes grown in lysimeters. This first trial indicates that shortage of water is not so serious in the early stages of growth as it becomes later.—Estación de Lisímetros, Madrid.
 1188. DUNEZ, A. 577.17+631.847
Résultats culturaux obtenus par l'utilisation de cultures hétéro-auxinées et vitaminées de fixateurs d'azote. (Cultural results obtained by using cultures of nitrogen-fixing organisms in media containing heteroauxins and vitamins.)
C.R. Acad. Agric. Fr., 1947, 33: 548-9.
- The results recorded are mostly those obtained from treating the seed of cereals, but potato was one of the crop plants included, the cultures being applied by spraying the seed tubers. The conclusion drawn is that the treatment of seed or tubers, with cultures of nitrogen-fixing organisms growing on culture media containing heteroauxins or vitamins, results in increases of yield of 25 to 30%.
1189. HOUGHLAND, G. V. C. 633.491-1.8
Net returns from potato fertilizers.
Amer. Potato J., 1948, 25: 12-16, bibl. 2.
The law of Diminishing Returns must always be in the mind of the potato grower tempted to increase his fertilizer applications excessively. This article shows why.
 1190. CALDWELL, J. S., CULPEPPER, C. W., AND BROWN, B. E. 633.491-1.811.9: 546.27
Effect of boron in fertilizer upon quality of dehydrated white potatoes.
Amer. Potato J., 1947, 24: 397-412, bibl. 14.
No significant differences were established. It is suggested that possibly the amount of boron used, namely 7½ lb. per acre, was excessive. Katahdin and Green Mountain were the varieties used.
 1191. TRUFFAUT, G., AND PASTAC, I. 633.491-2.4
Destruction des fanes de pommes de terre. (Destroying potato haulms.)
C.R. Acad. Agric. Fr., 1947, 33: 626-9.
A satisfactory substitute for sulphuric acid for destroying potato haulms was found to be 4-6% of dinitroresylate of ammonium with 1-1.5% dinitrate of ammonium applied at the rate of 1,500 litres per hectare [132 gal. per acre].
 1192. CALLBECK, L. C. 633.491-2.4
Killing potato tops with chemicals.
Addresses and Proc. Ann. Meeting Potato Sect. Ontario Crop Imp. Ass., 1947, Dep. Agric. Ontario, pp. 11-20.
The reasons for killing potato tops are discussed and notes given on the application and effects of the following chemicals: sulphuric acid, calcium cyanamide, sodium arsenate, sodium dinitro ortho cresylate, G-502, G-504, G-506. It is reported that in certain regions of the N. American continent unexplained tuber discoloration, apparently induced by top destruction, is regarded as serious. A research programme is outlined.—Charlottetown, P.E.I.
 1193. RICHARDSON, J. K. 633.491-2.4
Tests with potato vine killers in Ontario.
Addresses and Proc. Ann. Meeting Potato Sect. Ontario Crop Imp. Ass., 1947, Dep. Agric. Ontario, pp. 21-3.
An account of two preliminary tests with haulm-killers in Ontario. It is concluded that the vascular discoloration produced by chemical haulm-killers: (1) is influenced by age of plants, rapidity of kill, and environmental conditions before and after application, (2) appears similar to injury caused by severe frost, or leaf-roll virus infection, (3) does not seem to affect the growing or eating qualities of the tubers, (4) is reduced by boiling, and (5) varies with the variety grown.—St. Catharines, Ontario.
 1194. MONOT, G. 633.491-1.55
Expériences sur les arrachages échelonnés. (Experiments on date of harvesting potatoes.)
Pomme de Terre franç., 1948, 9: 3: 13-19.
In parts of France where potatoes are grown for seed the decision when to destroy the haulms involves a compromise between the yield of tubers and their freedom from virus disease. Experiments indicate that the haulms should be destroyed in the middle of July and the tubers harvested 10 to 15 days later. Most of the increase in yield gained after this date affects the larger tubers, which are of less value as seed.

1195. WAGER, H. G. 633.491
Quality of potatoes in relation to soil and season.
III. Time of lifting and the colour of the cooked potato.
J. agric. Sci., 1947, 37: 270-4.

Potatoes lifted early are, on the average, less liable to stem-end blackening than those lifted late; the amount of stem-end blackening increases during storage at +8° C., and certain samples of potato develop much stem-end blackening pigment if stored at a low temperature immediately after lifting.

1196. FENAROLI, L. 633.491
La patata dopo il raccolto. (The harvested potato.)
Ital. agric., 1947, 84: 528-34.

Among other subjects discussed are disinfection of tubers, dormancy, breaking of dormancy—including a long list of substances capable of achieving this—, prevention of germination of "seed" by several substances, particularly the methyl ester of α -naphthaleneacetic acid.

1197. AGRICULTURAL RESEARCH COUNCIL, LONDON. 664.84.21
Report of potato storage mission to the United States and Canada.
H.M. Stationery Office, London, 1947, pp. 32, bibl. 17, illus., 1s. 6d.

The main object of this mission was to collect information necessary for the initiation of a programme of research into potato storage problems in Britain and to determine whether any of the North American methods were directly applicable under British conditions. The following are amongst the many recommendations made in the report:—Data should be obtained on the comparative economies of clamp and permanent storage. The possibilities of centralized storage, to meet the needs of small growers, should be investigated. A comprehensive investigation into the design and operation of permanent storage buildings for potatoes in Britain is essential. Data should be obtained to decide whether it is necessary to use refrigeration in late spring. The possibilities of storage in ton crates should receive immediate attention. Special handling machinery should be developed for use in conjunction with existing methods of harvesting, grading and transport. Further investigations should be made on the influence of storage temperatures on culinary quality and vitamin C content. It is essential to intensify research into the influence of late blight and tuber diseases on keeping qualities. An investigation should be made into the use of sprout depressants. Improved methods of market presentation of potatoes should be examined. The construction of a small experimental store is recommended, as well as at least one commercial store in one of the main potato growing areas.

1198. EDGAR, A. D. 664.84.21.037
Shell-cooled potato storage.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 871-3, bibl. 3.

The shell-cooling process, which is briefly described, consists of circulating cool air under and around the potato storage bins rather than through the mass of potatoes. It is most satisfactory in large stores where power blowers and thermostatic control are used. It is claimed that shell cooling reduces shrinkage considerably, as well as preserving the eating qualities of the tubers. At least 10 million bushels of late-crop potatoes are now stored annually in the U.S.A. in stores of improved design.

1199. EDGAR, A. D. 664.84.21
Potato storage.
Fmrs' Bull. U.S. Dep. Agric. 1986, 1947, pp. 38, illus.

In this practical guide there are described stores ranging from the primitive but effective clamp or pit to large

commercial stores holding thousands of bushels and fitted with automatic ventilation. The storage and handling of potatoes are discussed as they affect the situation and design of the store.

1200. KRYTHE, N. 633.491-1.563
Het bewaren van aardappel-pootgoed. (The storage of seed potatoes.)
Meded. Direct. Tuinb., 1947, 10: 574-89.

The influence of storage conditions of seed potatoes, particularly with regard to temperature and light, on the crop was investigated. The conditions favourable for an early crop are (1) storing the tubers during the entire storing period at 9° C. or a higher temperature, with light, (2) storing the tubers at a temperature of 5° C. or lower to prevent the development of sprouts and after that, for at least 3 weeks before planting, an after-treatment at a higher temperature (13-17° C.) with light, to promote the growth of the sprouts, (3) storing the tubers at 5° C. and planting them very early. To obtain a maximum number of tubers the seed potatoes should be stored at 5° C. with light.

1201. GOIDANICH, G. 633.491-1.563: 577.17
Gli ormoni vegetali nella conservazione delle patate. (The use of growth substances in potato storage.)
Ital. agric., 1947, 84: 333-4.

A note of successful attempts by American workers to prolong dormancy in potato tubers by treatment with the methyl ester of α -naphthaleneacetic acid and other substances.

1202. ULRICH, R., AND ILDIS, P. 633.491-1.563: 577.17
Action comparée des vapeurs de 2-4 dichlorophenoxyacétate de soude et d' α -naphtylacétate de méthyle sur l'entrée en végétation des tubercules de pommes de terre. (The effect of vapours of sodium 2-4 dichlorophenoxyacetate and methyl ester of α -naphthaleneacetic acid on the sprouting of potato tubers.)
Rev. hort. Paris, 1948, 120: 11-12, bibl. 3.

Filter paper soaked in solutions of the growth substances were placed with samples of Bintje potatoes in ventilated boxes; these were stored at 0° and 10° C. 2,4-D at the highest concentration inhibited growth slightly, and at the lowest concentration stimulated growth markedly. The methyl ester of naphthaleneacetic acid inhibited sprouting and increased sugar formation.—Station Expérimentale du Froid, Bellevue.

1203. GARESE, P. 633.491: 581.03
Experiencias relacionadas con factores ambientales que influncian la tuberizacion de la papa. (The effect of environmental factors on tuber formation by the potato.)
Rev. Invest. agric. B. Aires, 1947, 1: 217-32, bibl. 20.

The author's experiments on the effect of light and temperature on the potato were designed to elucidate the adverse physiological effect of high temperature. The effects of temperature on the virus complex and on the vectors of virus are separate problems. Tubers of the variety Katahdin were harvested late, in the middle of July, at Balcarce. From the beginning of September until 6 October they were exposed to diffuse light in a cellar, where they became green and sprouted. They were then covered with moist cloth; tuberization began at the end of November. Sprouted tubers that had developed tubercles were planted on 3 December. The plants flowered on the 10th and they were harvested on 18 January. A test with tubers from which the sprouts had been removed showed that the stimulus of tuber formation is not localized. Greening caused by light appears to be beneficial in preparing the tubers for incubation; but during incubation light tends to

suppress tuberization. To determine the effect of temperature and the local effect of light three treatments were arranged, viz. all parts in darkness, shoots in darkness and tubers and rhizomes in light, and shoots in light and tubers and rhizomes in darkness; one set was exposed to a mean temperature of 22-4° C., the other to 29-7° C. Only a few plants formed tubers at the higher temperature, but all the plants at the lower temperature tuberized normally. When the temperature was favourable light only inhibited the development of tubers on the parts exposed.—Universidad Nacional de la Plata.

1204. MÜNSTER, J., AND BOULENAZ, A. 633.491-1.532.2
L'emploi de pommes de terre regermées est-il recommandable pour la plantation? (Should potatoes showing secondary growth be used as seed?)

Rev. romande Agric. Vitic., 1947, 3: 17-19.

In 1945 rain, following the very dry, hot summer in Switzerland, stimulated regrowth of late potatoes. Some mature tubers, which had developed secondary tubers, detached or as excrescences, were planted the following year; they gave rise to plants less productive than those from normal seed.—Lausanne.

1205. TURPIN, H. W. 633.491 + 633.71(68)
Agricultural education and research.
Fmg S. Afr., 1947, 22: 1086-1108.

This report mentions work on potatoes at several stations. At the Riet River Experiment Station tubers were lifted at the beginning of January and replanted at the end of the month after treatment with ethylene chlorhydrin. Experiments at Rustenburg showed advantages in the closer spacing of tobacco. DDT shows promise for the control of eelworm in tobacco seedbeds.

1206. PIETTRE, M. 633.491: 581.143.26.03
Activation de semences de pommes de terre aux basses températures—une augmentation de 40 p. 100 de rendement expérimental. (Stimulation of seed potatoes by low temperatures—increase in yield 40% in experiments.)
C.R. Acad. Agric. Fr., 1947, 33: 620-4.

A vernalization experiment with potato tubers is described. Tubers put into a cold chamber at 1-5° C. in November were divided into two lots, one of which was kept in the cold chamber until the time of planting (controls), the other being subjected to the following treatment: the tubers were sprouted in moist sand at a temperature of 12-16° C. for a fortnight, then, after the development of sprouts 2-4 mm. long, returned to the cold chamber for a period of 55 days at a temperature of 2° C. and a relative humidity of 95%. Planting was carried out on 27 April. The plants from the treated tubers gave a yield of 39-5% more than that of plants from the control tubers.

1207. DEMESMAY, H.) 633.491-1.532.2
Le froid et les pommes de terre. (The effect of chilling seed potatoes.)
Pomme de Terre franç., 1948, 9: 2: 23.

Seed potatoes were exposed to a temperature of 12-15° C. in moist sand for 3 days and then kept for 50 days at 2-3° C.; the resulting plants matured 15 days before the controls, and produced a greater weight of tubers by 40%. Chilling increases sugar content and stimulates the growth of the plants.

1208. SINGH, SWARN. 633.491-1.532
Potato buds as seed.
Punjab Fruit J., 1947, 11: 253-5.

A record of wartime experiments carried out in India comparing the yields from peelings, small sets, cut seed and eyes with the yield from normal seed potatoes. Seed potatoes and small sets outyielded the others. The successful use of young tuber sprouts, 1½-2½ in. long, as planting material when multiplying new varieties is mentioned.

1209. GLUŠČENKO, I. E. 633.491-1.532.2
Clonal selection of potatoes. [Russian.]
Agrobiologija, 1946, No. 4, pp. 37-45, bibl. 10.

The propagation of potatoes from adventitious buds arising from internal tissues of tubers is discussed (see *J. Genetics*, 1939, 32: 73-7), and experiments are described in which plants raised from such buds are compared with others raised in the usual way. Most of the experiments were carried out with Zarnica, a variety with pink eyes and crown-end, the rest of the skin being white. Plants raised from adventitious roots of this variety yielded white tubers (the "recessive" colour), but the progeny of these tubers showed three types. Some were white, some were the colour of the original strain, while others had traces of colour only. Other differences between the control plants and those raised from adventitious buds are recorded.

1210. WILSON, J. D. 632.111: 633.491 + 635.64
Relation between spray treatments and frost damage to potatoes and tomatoes.
Farm and Home Research, 1947, 32: 77-82.

Potato and tomato plants that had been sprayed during their life with organic fungicides containing zinc were less damaged by frost than those protected by copper sprays.—Ohio Agric. Exp. Stat.

1211. LUNIN, M. 633.491
Restore the health of potatoes—increase the yield. [Russian.]
Kolhoznoe Proizvodstvo (Collective farming), 1947, No. 2, pp. 34-6.

Growers are advised to plant only sound "seed" tubers and to plant them according to the "nest" or hill method. After the tubers have been hardened off by exposure to light for 7 to 15 days they should be carefully examined and just before planting those should be sorted out that show (1) rot of any kind, (2) latent infection (tubers that do not turn green on exposure to light), (3) eyes not sprouting, (4) thin weak sprouts, and those that are spindle-shaped, with pointed ends. At the time of planting the tubers should be cut lengthwise and any showing ring rot or any symptoms of disease should be eliminated.

1212. BALD, J. G. 633.491-2.8
Potato virus diseases in Australia.
Farming, 1947, 1: 182-5.

The author briefly summarizes the history and general background of knowledge of these diseases in Australia, outlines some of the investigations there and describes the steps taken to combat the diseases.

1213. MÜNSTER, J. 633.491-2.8
Comment décèler—pendant l'hiver—les maladies à virus de la pomme de terre. (The detection in winter of virus diseases in potatoes.)
Rev. romande Agric. Vitic., 1947, 3: 90-3.

At the Federal seed testing station at Mont-Calme, Lausanne, a modification of the tuber test is made to detect virus diseases in samples of seed potatoes. Pregermination is advisable, and for planting before the beginning of January the eyes are soaked in 3% chlorhydrin and kept in a closed jar at 20-24° C. for 16 hours. The eyes are removed with a small piece of tuber tissue and planted in a mixture consisting of equal parts of sand and potting soil sterilized by steam; the temperature is kept between 12° and 18° C. and water at the latter temperature is used for the plants. Plants started before the end of January need two or three hours of artificial illumination each day.

1214. HUTTON, E. M. 633.491-2.8
Resistance in the potato to the spotted wilt virus [in Australia].
J. Aust. Inst. agric. Sci., 1947, 13: 190-2, bibl. 3, illus.

It is concluded that this disease will not menace the Australian potato industry.—Div. Plant Industry, C.S.I.R., Australia.

1215. BAWDEN, F. C., AND KASSANIS, B. 633.491-2.8
The behaviour of some naturally occurring strains of potato virus Y.
Ann. appl. Biol., 1947, 34: 503-15.
Strains of potato virus Y differ widely in virulence. The symptoms caused by these strains in seven potato varieties and tobacco are described and compared with those caused by the serologically related potato virus C.—Rothamsted.
1216. SANFORD, G. B. 632.3: 633.491 + 633.3
The occurrence of bacteria in normal potato plants and legumes.
Sci. Agric., 1948, 28: 21-5, bibl. 5.
Many bacteria were isolated from stem tissues of normal potato plants and *Phaseolus vulgaris* and from tap roots of *Medicago* spp. and *Melilotus* spp. The bacteria were present whether the sets had been planted whole or cut, sterilized or not.—Dominion Laboratory of Plant Pathology, Edmonton, Alberta.
1217. RACICOT, H. N. 633.491-2.3
Practical methods for the control of common scab of potatoes.
Contr. Div. Bot., Dep. Agric. Canada, 845, 1946, 8 pp.
The control of common potato scab (*Actinomyces scabies*) requires the use of clean seed, proper selection and management of the land, the judicious use of fertilizers and manures and of the bedding used for livestock, and the maintenance of a high humus content of the soil. Acid fertilizers (e.g. sulphate of ammonia) will gradually increase the acidity of the soil and make it progressively less favourable for scab. Green manures or green crops, ploughed or dug in, have been shown to decrease scab. Standard seed treatments are (1) standard formalin, (2) hot formalin, (3) standard corrosive sublimate and (4) organic mercurial disinfectant. Directions for the use of these are given.
1218. COOK, H. T., AND NUGENT, T. J. 633.491-2.32
Potato scab in relation to calcium, soil reaction and the use of acid-forming and non-acid-forming fertilizers.
Bull. Va. Truck Exp. Stat. 108, 1942, pp. 11, bibl. 25 [received 1948].
In Virginia the incidence of potato scab, *Actinomyces scabies*, can be reduced by growing potatoes at a soil pH of 5.0 to 5.2. The more acid soils should be limed, and the use of acid-forming fertilizers avoided. More alkaline soils in which scabby potatoes are produced should be used for other crops until the use of acid-forming fertilizers has lowered the pH to 5.2.
1219. HOOKER, W. J., AND SASS, J. E. 633.491-2.3
Some histological features of potato stem necrosis associated with *Actinomyces scabies*.
Abstr. in *Phytopathology*, 1948, 38: 14.
Varieties of potato susceptible to tuber scab showed stem necrosis caused by the scab organism, while varieties resistant to tuber scab were resistant to stem necrosis also.
1220. LUTMAN, B. F. 633.491-2.314
Potato scab control.
Pamphl. Vt. agric. Exp. Stat. 3, 1947, pp. 3.
The recommendations for the control of [*Actinomyces*] scab include (1) Disinfection of seed tubers. (2) Application of sulphur to the soil. (3) Long rotation (6 or 7 years). (4) Removal of potato tops and roots after harvesting the crop. (5) Lime, wood ashes, manure, or other materials likely to increase soil alkalinity should not be applied immediately before planting potatoes. (6) Potatoes should not be planted on soils where in the past there have been old woodyards, manure piles, haystacks, sawdust or other organic materials.
1221. PERRAULT, C. 633.491-2.3
L'antagonisme de certains micro-organismes envers *Corynebacterium sepedonicum*. (The antagonism of certain micro-organisms to *Corynebacterium sepedonicum*). [English summary 8 l.]
Canad. J. Res., 1947, 25, Sec. C, pp. 185-8, bibl. 3.
Several organisms isolated from rotted potato tubers affected with ring rot produced diffusible substances that prevented growth of the pathogen on agar.—Laboratoire Fédéral de Phytopathologie, Ste-Anne-de-la-Pocatière, Quebec.
1222. RACICOT, H. N. 633.491-2.3
A sound policy for the control of bacterial ring rot in Canada.
Contr. Div. Bot. Dep. Agric. Canada 806, 1945, 8 pp. [received 1948].
Various aspects of bacterial ring rot (*Corynebacterium sepedonicum*) of potatoes, including control and legislative measures, are discussed. The only control measure that can be recommended is the complete eradication of the disease on every farm where it occurs. Until the country is free or practically free from ring rot the grower must adopt the utmost sanitary precautions, including a yearly cleaning and disinfection of stores, machinery, equipment and containers. With the existing "no tolerance" regulation in the production of certified seed potatoes, growers will always be assured of a supply of good seed.
1223. VAN SCHAACK, V. 633.491-2.3
Antibiotics and potato ring rot.
Abstr. in *Phytopathology*, 1948, 38: 27.
Inoculated (with *Corynebacterium sepedonicum*) and penicillin-treated potato seed-pieces did not grow, although controls produced healthy plants. Inoculated, streptomycin-treated seed-pieces gave good growth with both potato varieties tested.
1224. DE MAIA, R. M., AND D'OLIVEIRA, M. DE L. 633.491-2.3
Doença da batateira causada por uma variedade do *Bacterium solanacearum* E. F. Smith. (A disease of the potato caused by a variety of *Bact. solanacearum*). [English summary ½ p.]
Agron. lusit., 1945, 7: 195-205 [received 1948].
A bacterial disease of potatoes prevalent over a large area in Portugal shows symptoms similar to those of potato brown rot caused by *Bact. solanacearum*, except that no brown discoloration of the stem or tuber tissues was ever observed. It is attributed to *Bact. solanacearum* var. *asiaticum*. Control measures to prevent its spread and to eradicate it from infected soils are suggested.
1225. AFANASIEV, M. M., AND MORRIS, H. E. 633.491-2.4
Time of infection and accumulative effect of *Rhizoctonia* on successive crops of potatoes.
Amer. Potato J., 1948, 25: 17-23.
Results show the necessity for using long rotations when trying to get rid of this disease.
1226. BOYD, A. E. W. 633.491-2.48
Some recent results of potato dry rot research.
Ann. appl. Biol., 1947, 34: 634-6.
Observations are recorded of time and method of dry rot infection (mostly caused by *Fusarium caeruleum*) in laboratory experiments and in the field, and on chemical control by dips and dusts. Very satisfactory control was achieved by dipping tubers in organo-mercury solutions immediately after the tubers had been lifted and dressed, and storing them subsequently in boxes. Formalin appeared to give a less efficient control. Promising results were obtained with thymol dust in small-scale and field experiments, but some damage to the tubers was recorded in the field trials.—Corstorphine, Edinburgh.

1227. BLACK, W. 633.491-2.411

Blight in relation to potato breeding.

Ann. appl. Biol., 1947, 34: 631-3.

The common strain of the blight fungus (*Phytophthora infestans*) and three other strains were used in testing potato seedlings for resistance to the disease. From the results obtained it may be concluded that qualitatively different strains of blight may develop, and that quantitative differences in virulence may be exhibited in the development of these qualitatively different lines.—Scottish Plant Breeding Station, Corstorphine, Edinburgh.

1228. COOK, H. T. 633.491-2.411

Forecasting late blight in eastern Virginia in 1947.

Abstr. in *Phytopathology*, 1948, 38: 6.

A method of forecasting late blight epiphytically was put to a practical test. Forecasts were issued weekly from 15 May to 5 June based on cumulative rainfall and mean temperature graphs. All these forecasts stated that the weather was unfavourable for blight and that control measures were unnecessary; they proved correct.

1229. DAVIDSON, R. S., AND RICH, A. E. 633.491-2.411

Performance of new fungicides for control of potato late blight.

Abstr. in *Phytopathology*, 1947, 37: 847-8.

On 12 synthetic organic materials tested none effected such complete control as bordeaux mixture. Materials that effected significant control produced less injury to the foliage than did the copper-containing sprays.

1230. THURSTON, H. W., JR., LEACH, J. G., AND WILSON, J. D. 633.491-2.952

Chromates as potato fungicides.

Abstr. in *Phytopathology*, 1948, 38: 27.

Copper zinc chromates have insect-repellent properties equivalent to bordeaux mixture, and when used with DDT the yields produced have equalled or surpassed those from "fixed coppers", Dithane, and bordeaux.

1231. NIEDERHAUSER, J. S., RAWLINS, W. A., AND FRENCH, A. M. 633.491-2.95

1946 potato spray and dust experiments in New York State.

Abstr. in *Phytopathology*, 1947, 37: 849.

Dithane (D-14) (disodium ethylene bisdithiocarbamate) ranked first in three of four spray experiments, and Dithane (HE-178) was first in two of three dust experiments. The yields obtained with fixed coppers were about equal to those obtained with bordeaux spray or copper lime dust.

1232. CANNON, R. C. 633.491-2.78

Protection of harvested potatoes from tuber moth attack.

Qd agric. J., 1947, 65: 242-4.

The use is recommended of any one of the three dusts: derris (0.5% rotenone), DDT (2% *p-p* isomer), and magnesite, as giving protection against this moth, *Gnorimoschema operculella*. The dusts are applied, at the rate of 8 lb. per ton of potatoes, either in the field at the bagging stage, or, on the bench in the grading shed.

1233. BONNEMAISON, L. 632.76: 633.491 + 635.11

Essais préliminaires de traitements contre les taupins. (Preliminary trials against click beetles.)

C.R. Acad. Agric. Fr., 1947, 33: 556-9.

An account of trials carried out for the control of click beetle (*Agriotes* sp.) in fields of cereals, beetroot and potato, using a number of the recently introduced synthetic organic preparations. Of the products tried hexachlorocyclohexane was the most effective. Applied as a powder at 20 kg. per hectare it caused a marked check in growth on potatoes, and often gave a disagreeable taste to the tubers; it should be applied at least two years before potatoes are

planted. When applied in autumn it is less toxic to plant growth than when applied in spring.

1234. SPOON, W., AND LOOSJES, F. E. 633.491-2.76

Derris tegen de colorado-kever. (Derris for the control of Colorado beetle.)

Meded. Direct. Tuinb., 1947, 10: 461-2.

Where there are vegetables in the vicinity of potatoes that have to be sprayed against Colorado beetles the author recommends derris instead of the poisonous arsenate of lime. Derris with a rotenone content of at least 0.75% can be applied with success as a dust, or as a spray with a rotenone content of at least one part rotenone in 7,500 parts (by weight) of water.

1235. KULASH, W. M. 633.491-2.76

Benzene hexachloride, DDT, and chlordane for Colorado potato beetle control.

J. econ. Ent., 1947, 40: 640-3, bibl. 5, being *J. Pap. N.C. agric. Exp. Stat.* 259.

All DDT preparations, except one with a high content of the orthopara isomer, gave good field control of Colorado potato beetle larvae. Chordane was equally effective. Benzene hexachloride had less residual effect than DDT.

1236. KULASH, W. M. 633.491-2.76

DDT and benzene hexachloride for potato flea beetle control.

J. econ. Ent., 1947, 40: 651-4, bibl. 5, being *J. Pap. N.C. agric. Exp. Stat.* 258.

Various DDT preparations and 666 gave good control of the potato flea beetle *Eptix cucumeris*, and the tobacco flea beetle *E. hirtipennis* on potatoes. The Sequoia variety is more resistant to these pests than some other varieties.

1237. GREENWOOD, D. E. 632.76: 633.491

Benzene hexachloride and wireworm control.

J. econ. Ent., 1947, 40: 724-7.

Benzene hexachloride, applied broadcast as a dilute dust, can effectively control wireworms in potatoes. At $2\frac{1}{2}$ lb. crude 666 per acre the tubers are not contaminated.—Connecticut Agric. Exp. Stat.

1238. PEPPER, B. B., WILSON, C. A., AND CAMPBELL, J. C. 632.76: 633.491

Benzene hexachloride and other compounds for control of wireworms infesting potatoes.

J. econ. Ent., 1947, 40: 727-30, being *J. Pap. N. Jer. agric. Exp. Stat.*

Benzene hexachloride is particularly effective for the control of wireworms, *Limonijs agonus* and *Agriotes mancus*, in potato fields; it may be applied either in autumn or at planting time. DDT applied at the time of planting was also promising.

1239. PLANTENZIEKTENKUNDIGE DIENST. 633.491-2.76

Tweede bericht coloradokeverbestrijding 1948. (Second report on colorado beetle control 1948.)

Ber. PIZiekDienst Wageningen 736, 1948, pp. 2.

The Colorado beetle may be controlled by spraying with 0.5% calcium arsenate or 1% of a preparation containing 10% DDT, the latter being less poisonous. Preparations of benzene hexachloride are effective, but they should not be used on potatoes intended for human consumption. The effect of derris is too short for it to be of service against this pest.

1240. MAYNÉ, R., AND BRENY, R. 632.76: 632.96

Les éclosions de *Picromerus bidens* L. dans la nature. (The natural hatching of *Picromerus bidens* eggs.) [Summary in Dutch, English and German.]

Parasitica, 1947, 3: 53-65.

An account of observations on the hatching of eggs of a predator of the Colorado beetle. Eggs hatched between

mid-May and beginning of June, on days with mean temperatures of 15-16° C. under shelter, at 1.5 m. above ground level.

1241. CARROLL, J., AND DEASY, D. — 633.491-2.64

Slug damage to potato tubers.

J. Dep. Agric. Eire, 1947, 44: 41-6.

Slug damage may be reduced by avoiding susceptible varieties and lifting the crop as early as possible. The use of metaldehyde bait after each mounding up might well prove very effective.

Tobacco.*

1242. BORDELEAU, R. — 633.71(714)

Quebec can grow good cigar leaf tobacco.

Better Crops with Plant Food, 1948, 32: 1: 19-22, 47-9.

The writer discusses a survey of cigar leaf tobacco growing in two districts of Quebec. Most growers apply some 20 tons of farmyard manure and about $\frac{1}{2}$ ton of NPK per acre. On rich alluvial soils the crop has been grown continuously for 50 years; on less rich soil it is grown for 2 or 3 years consecutively in a 5 or 6 year rotation. The relations of soil organic matter, N, P and K to yield, quality and burn are discussed.—Dominion Exp. Stat., L'Assomption, Quebec.

1243. HURD, E. F. — 633.71(42)

Tobacco-growing in Britain.

Country Life, 1948, 103: 2664: 282-3.

The author gives clear instructions for the man who wants to grow and cure his own tobacco in England. With regard to the types most suitable *Nicotiana affinis*, normally grown in the flower garden, is totally unsuitable. The main smoking tobaccos come from *N. tabacum* (Havana cigar type), *N. macrophylla* (source of Maryland tobacco), *N. virginica* (Rhodesian types) and *N. rustica* (a smaller plant widely grown in Germany, Hungary and the East Indies). The Havana type when grown in England tends to coarseness. The Austrian type—probably *N. rustica*—is promising and *N. virginica* should be available and should grow satisfactorily. Seed is sown in March in a cool greenhouse and leaves will normally be ready for cutting from mid-August to early September. [The author's instructions for curing sound almost too easy to anyone who has seen the time and skill normally devoted to this operation in tobacco-growing countries.]

1244. BROWN, D. D. — 633.71

Dark fire-cured tobacco culture in Southern Rhodesia.

Rhod. agric. J., 1947, 44: 674-93.

An account of the cultivation, harvesting and processing of dark fire-cured tobacco in parts of Southern Rhodesia. Crop rotation is essential to control the root-knot eelworm, *Heterodera marioni*, and resistant crops are discussed. Curing is described in detail.

1245. CLAYTON, E. E. — 633.71(73)

New kinds of tobacco [in U.S.A.]

Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 363-8, bibl. 4.

During the 300-odd years that tobacco has been cultivated intensively in the U.S.A., disease problems have multiplied. In 1934 the U.S.D.A. undertook an extensive search in Mexico, Central and South America for disease-resistant tobaccos, a major object being to find a tobacco resistant to Granville (bacterial) wilt. The successful outcome of this search is described and a short description given of the new fire-cured and other varieties which have been developed in recent years. A final note describes the progress being made towards the solution of some disease problems as

yet unsolved: viz. root knot and nematode root rot; wild fire, and blue mould.

1246. DARKIS, F. R., HACKNEY, E. J., AND GROSS, P. M. — 633.71(495/496)

Turkish tobaccos.

Indust. Engng Chem., 1947, 39: 1631-42, bibl. 29.

The authors' extensive chemical analyses of tobaccos grown in various parts of Greece and Turkey in two seasons show considerable seasonal and regional variation. A uniform blend could be maintained by an experienced tobacco blender, given a mixed and sufficient supply.—Duke University, Durham, N.C.

1247. BROWN, D. D. — 633.71-1.531

Tobacco culture in Southern Rhodesia: seed-beds.

Rhod. agric. J., 1947, 44: 509-19, bibl. 1.

This article replaces Bulletin 1278 of the Department of Agriculture, now out of print. In it the author gives practical advice on the selection of site and soil for tobacco seed-beds, the preparation of beds, the time to sow, sowing, covering and care of beds.

1248. RIBIERO FILHO, J. — 633.71-1.531

Produção de muda de fumo. (Raising tobacco seedlings.)

Ceres, 1946, 7: 192-9, bibl. 4 [received 1948].

Before sowing tobacco the seed-beds should be sterilized by burning straw, etc., on them two or three times. The seed should be soaked in corrosive sublimate solution (1 g./l) for seven minutes and then washed and dried. Various materials can be used to protect the beds. The control of pests and diseases is described.—Viçosa, Minas Gerais.

1249. STALÉ, J. — 633.71(494)-1.8

Contribution à l'étude de l'amélioration des tabacs indigènes. (Contribution to the study of the improvement of tobacco grown in Switzerland.) I. Influence des engrais sur leur composition chimique. (Influence of fertilizers on chemical content.)

Ann. agric. Suisse, 1940, 41: 55-94, bibl. 28.

STALÉ, J., AND BOVAY, E.

Ibid. II. Influence de la fumure azotée sur la qualité et sur la rendement. (Influence of nitrogenous fertilizer on quality and yield.)

ibid., 1947, 48: 225-49, being *Publ. Stat. fed. Ess. vitic. arboric. Lausanne* 355.

I. On acid soils sulphate of potash improved the quality of tobacco by raising the carbohydrate content of the leaves, and it increased yield as much as did complete fertilizer mixtures. On calcareous soils quality was little affected by fertilizers and sulphate of potash had less effect upon yield than had the complete fertilizer. The primitive local method of drying tobacco reduces its commercial value. II. Nitrogenous manures applied to tobacco grown in the field or in boxes increased the nicotine content of plants that were not topped. Nitrate was the most effective form for increasing carbohydrates in the leaves; the optimum rate of manuring was between 40 and 60 kg. of N per ha. Heavy organic manuring depressed leaf quality.

1250. GILBERT, F. A. — 633.71-1.811.9: 546.56

Copper as a fertilizer amendment for tobacco and other crops.

Better Crops with Plant Foods, 1948, 32: 2: 8-11, 44-6, bibl. 3.

In a number of trials in some of the eastern United States, the addition of copper sulphate at 20 to 50 lb. per acre frequently increased the yield or quality of tobacco. No deficiency symptoms were observed in the control plots.

* See also 1061n, 1205.

1251. MOFFETT, A. A. 633.71-1.87
The use of compost for flue cured tobacco. Part I,
Field trials.
Rhod. agric. J., 1947, 44: 654-64.
THOMPSON, J. W.
Part II, Chemical effects.
Ibid., 1947, 44: 665-73, bibl. 2.

The effects of treating with kraal compost + fertilizer, various farm composts + fertilizer, sunn hemp compost with and without fertilizer and fertilizer alone were compared. Sunn hemp compost without fertilizer gave the lowest yield and least return; all other treatments produced leaf fetching a higher price, and those including compost and fertilizer gave greater yields and returns than fertilizer only. The composts varied in composition; their action depends on their C : N ratio, which should be low, and the supply of phosphate and potash they provide.—Tobacco Research Station, Trelawney.

1252. GARNER, W. W. 679.7.021.1
Tobacco curing.
Fmrs' Bull. U.S. Dep. Agric. 523, revised 1947,
pp. 22, illus., 10 cents.

A short introduction explaining the nature of the ripening and curing processes is followed by a comparison of the merits of curing picked leaves with curing on the stalk. The bulk of the bulletin is devoted to the details of air, flue and fire curing as practised in the U.S.A.

1253. TOBACCO RESEARCH BOARD OF SOUTHERN RHODESIA. 679.7.021.1: 631.588.1
Electric curing of tobacco.
Rhod. agric. J., 1947, 44: 458-62, illus.

A preliminary account of experimental work, begun in 1947, with three primary objects: (a) To verify that there would be no major difficulties in applying electricity to tobacco curing. (b) To determine the factors which affect the economy of curing by electricity. (c) To evolve a simple and efficient technique for general application. As a result of the investigation a process is proposed with the following salient features: Barns are arranged in blocks of four with bulking and grading sheds attached around the perimeter. Tobacco will be picked and clipped directly on to sticks in the land and transported to, and put straight into, the barn. Forced air circulation through the tobacco will enable a much tighter pack, and it is estimated that the limit is of the order of three times the normal barn, corresponding to about 90 leaves per stick. A system of heat transfer from a barn discharging moist air to one requiring low temperature high humidity has been adopted to give maximum economy of heat. Automatic temperature control is utilized. It is estimated that the output of an electric barn could reach the maximum of three times that of the standard flue-cured barn, and that its use would, therefore, considerably reduce the number of barns required under present conditions. With the increased efficiency derived from electrically heated barns, the cost of curing tobacco should compare favourably with the present cost. The proposed layout of the 4-barn unit is shown in plan and elevation, with dimensions. A full and detailed account of the experiments "will be made available in due course".—Hillside Exp. Stat., Salisbury, S. Rhodesia.

1254. O'BANNON, L. S. 679.7.021:1
Principles of burley tobacco barn operation.
Bull. Ky Agric. Exp. Stat. 501, 1947, pp. 68, illus.

The author sets out to explain what causes various conditions inside tobacco curing barns and shows how to bring about those favourable for good curing. Some of the work reported appeared in an earlier bulletin of the station, No. 444 of 1943.

1255. TAKAHASHI, W. N. 632.8: 633.71
Respiration of virus-infected plant tissue and effect of light on virus multiplication.
Amer. J. Bot., 1947, 34: 496-500, bibl. 18.

Healthy and virus-infected tobacco leaf tissue was cultured for eight days. Virus infection generally depressed respiration in light and darkness, without affecting the respiratory quotient. More virus was produced in tissue culture in light than in darkness. [From author's summary.]—University of Rochester, N.Y.

1256. KNIGHT, C. A. 633.71-2.8
The nature of some of the chemical differences among strains of tobacco mosaic virus.
J. biol. Chem., 1947, 171: 297-308, bibl. 32.

Chemical and microbiological assays for nineteen amino acids were made on highly purified preparations of eight strains of tobacco mosaic virus. Considerable differences were established. The suggestion is made that, in some cases at least, mutation among tobacco mosaic viruses involves stepwise changes in amino acid content. [From author's summary.]—Rockefeller Institute for Medical Research, Princeton, N.J.

1257. SMITH, T. E., AND CLAYTON, E. E. 633.71-2.3
Inheritance of resistance to bacterial wilt in tobacco.
J. agric. Res., 1948, 76: 27-32.

Resistance to bacterial wilt was recessive and controlled by multiple genes. Of the flue-cured varieties used as parents variety 400 produced the most progeny with high resistance and good agronomic characters.

1258. CLAYTON, E. E. 633.71-2.3
Breeding tobacco for wildfire resistance.
Abstr. in *Phytopathology*, 1948, 38: 5-6.

Resistance to tobacco wildfire was obtained from *Nicotiana longiflora*, a small wild species. Field studies of resistant progeny from third and fourth backcrosses to susceptible tobacco showed that resistance was not linked with any undesirable growth characters.

1259. ANDERSON, P. J. 633.71-2.4
Control of tobacco mildew.
Abstr. in *Phytopathology*, 1947, 37: 847.

Dusting tobacco seed beds with a 20-80 Fermate (ferric dimethyl dithiocarbamate) dust gave as complete control of mildew as did the standard Fermate spray, 1-50. Two bismuth subsalicylate spray preparations gave equally good control.

1260. ANON. 633.71-2.4
Downy mildew (blue mould) of tobacco.
Agric. Gaz. N.S.W., 1947, 58: 571-4.

Downy mildew of tobacco (*Peronospora tabacina*) is the most serious disease of tobacco plants in New South Wales. Control measures recommended are, (1) Destroy all crop remains after the leaf has been harvested and eradicate volunteer plants and native wild tobacco plants in the vicinity of the seed beds. (2) Avoid areas for seed-beds where infection has occurred previously. (3) Use disease-free seed. (4) Use fertile soil in seed-bed. (5) Do not sow too thickly initially, and, later, if necessary, thin out to avoid overcrowding in the beds. (6) Destroy mildewed plants in the beds as soon as they are observed. (7) Seedlings should be subjected to treatment with benzol fumes shortly after emergence, and fumigation should continue each night until the seedlings are ready for transplanting.

1261. WOLF, F. A. 633.71-2.4
Tobacco downy mildew, endemic to Texas and Mexico.
Phytopathology, 1947, 37: 721-9.

All available evidence indicates that *Peronospora tabacina* is endemic to southern Texas and the adjacent part of northern Mexico. Eradication of the fungus does not appear feasible or practicable and such a venture would probably result in failure.

1262. VAN DER LAAN, P. A. 633.71-2.4
Antibiotische stoffen als fungicide tegen *Cercospora nicotianae* op tabak. (Antibiotics as fungicides against *Cercospora nicotianae* on tobacco.) [English summary 1/2 p.]
Tijdschr. Plziekt., 1947, 53: 180-7, bibl. 15.

Of the antibiotics tested against *Cercospora nicotianae*, the cause of frog-eye disease of tobacco in the tropics, the best results were given by gliotoxine-containing extracts from *Trichoderma viride*, strain 211 of Brian; this antibiotic does not burn tobacco leaves and has a highly fungistatic and fungicidal action.

1263. ANDERSON, P. J. 633.71-2.651.3
Nematodes on tobacco in Connecticut.
Abstr. in *Phytopathology*, 1947, 37: 838.

Two nematodes have been found causing stunting of tobacco plants in Connecticut, viz. the root-knot nematode (*Heterodera marioni*), and the meadow nematode (*Pratylenchus pratensis*).

1264. VALLEAU, W. D., AND JOHNSON, E. M. 633.71-2.651.3
The relation of meadow nematodes to brown root-rot of tobacco.
Phytopathology, 1947, 37: 838-41.

There is good evidence that nematodes, apparently *Pratylenchus pratensis*, cause extensive injury to the roots of tobacco and of several other crop plants, and that this injury is of the brown root-rot type.

1265. ALLEN, N., AND POLLARD, H. N. 633.71-2.76
Baits to control green June beetle larvae in tobacco-plant beds.
J. econ. Ent., 1947, 40: 655-60, bibl. 3.

For controlling larvae of the green June beetle, *Cotinus nitida*, in tobacco seed-beds the most effective poison bait was composed of 4 lb. barium, sodium, or potassium fluosilicate, 25 lb. wheat middlings and about 2 1/2 gal. water.—South Carolina Agric. Exp. Stat.

1266. GISQUET, P., AND QUIDET, P. 633.71-2.7
Emploi des insecticides de synthèse contre les parasites du tabac (DDT, HCH, et SPC). (Synthetic insecticides for the control of tobacco pests.)
C.R. Acad. Agric. Fr., 1948, 34: 134-40.

DDT (1 : 1,000) gave good results against the larvae of owl moths (*Euxoa segetum*, *Feltia exclamatoris* and *Agrotis ypsilon*) and of click beetles (*Agriotes obscurus* and *A. lineatus*) without causing injury to the plants. HCH and SPC were also effective but when applied to the young plants they had a depressing effect.

Other Crops.

1267. ANON. 633.524
Genista fibre.
Food and Agric., 1947-48, 1: 213.

The dearth of textiles in France has given rise to a new industry since 1942, the extraction of fibre from genista. Two varieties are used, Spanish broom and "the ordinary common broom". The fibre is mixed with wool, cotton or flax in the making of mixed fibres, usually 70% wool and 30% broom fibre. When broom is cultivated on waste land yields of 10 to 14 tons of straw per hectare can be obtained, but wild stands yield only 1/2 to 1 1/2 tons per hectare. The natural stands of broom in France cover over 8 million hectares.

1268. ČAJLACHJAN, M. H. 632.95: 633.522
Pseudo-immunity in plants [to broomrape].
C.R. Acad. Sci. U.R.S.S., 1947, 56: 99-101.

Experiments were carried out with three varieties of hemp (*Cannabis sativa*) grown in soil which had been sown with

seeds of *Orobanche ramosa*. The results showed that (1) The Italian hemp was practically immune to broomrape. (2) The Novgorod Seversk hemp was affected both in the long and in the short day, the infection being more pronounced in long days. (3) In the variety Karpogorsk the plants were susceptible under natural long day conditions, but under short day conditions they were unaffected by broomrape. The Karpogorsk plants are not immune with regard to their anatomical, physiological and biochemical properties, and are easily affected under conditions of natural long day. Under short day conditions, owing to the reduced period of growth and developmental cycle, they acquire complete resistance. The doctrine of plant immunity places such facts in a special "escape from infection" category, due to earliness and early maturation. The author believes that such phenomena are widespread among plants, interacting not only with parasitic fungi but also with phanerogamic and other parasites, and that they may be termed "pseudo-immunity".

1269. FLETCHER, L., AND McLINTOCK, R. P. 633.79
Brewing trials with four new varieties of hops raised by Prof. E. S. Salmon at Wye College, Kent; 1946 growth.
J. Inst. Brew., 1947, 53: 249-50.

Tabulated data of hops WFG 19, WFB 117, WFI 36 and WFC 69, showing percentages of α and β resins, P.V., general appearance, aroma, etc., copper hop tests and dry hop tests.

1270. GEORLETTE, R. 633.79
Caractères morphologiques des sortes belges de houblon (*Humulus lupulus* L.) cultivées à la Station d'Esschene. (Morphological characters of Belgian hop varieties at the Esschene station.)
Ann. Gembloux, 1948, 54: 15-23, bibl. 6.
"Land" varieties and local hybrids are described.

1271. MAGIE, R. O. 633.79: 632.8
"Slip-down", a recently discovered virus disease of hops.
Photostat copy of *Farm Research*, Oct., 1937, pp. 10 and 13 [received 1948].

"Slip-down" has been shown to be transmitted by the hop aphid, which indicates that it is probably an infectious virus disease. Bine growth of diseased plants is quite slender. Weak lateral bines are produced in abundance during July, making a typically diseased hill appear squat and bushy. This added weight of growth is usually enough to cause the non-climbing bines to slip down the pole. The leaves of diseased plants are curled and about half normal size, the older leaves being dark green. A common symptom in June is a blotch of chlorotic tissue near the centre of young leaves and a chlorotic ring-spot pattern develops on a few leaves during July. Diseased hills bear small hops immature at harvest and do not recover. The English Cluster type of hop is very susceptible, but on two varieties, the true Canada Red and an early hop Palmer Seedling, the disease has not been seen, and hop plants from the West Coast have been free from it. Control measures are the planting of healthy stocks only and the raising of resistant varieties.

1272. POWERS, W. L. 633.822
The management of mint soils.
Better Crops with Plant Food, 1947, 31: 12: 15-20, 46, bibl. 2.

An account of the extensive cultivation of mint, *Mentha piperita*, in Oregon. Potassium is the most important fertilizer; its use increases the yield of mint and tends to improve quality of oil on peat and muck soils. Regular irrigation is generally desirable.

1273. BERKELEY, G. H. 633.842-2.8
A strain of the alfalfa mosaic virus on pepper in Ontario.
Phytopathology, 1947, 37: 781-9; bibl. 10.
An unusual type of mosaic (chlorotic rings, spots and patterns on leaves and fruit) was found on sweet pepper (*Capsicum frutescens* L.), var. California Wonder, in Ontario in 1943 and 1944. Tests indicated that the virus was a strain of the alfalfa mosaic virus, and the name *Marmor medicaginis* var. *capsici* is suggested for it.—Dominion Laboratory of Plant Pathology, St. Catharines, Ontario.
1274. REED, I. F. 633.85-1.51
Equipment for oil crops.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 847-50, bibl. 3.
Amongst the new equipment described are two castor bean hullers and a portable tung nut huller. Attempts to develop machinery for harvesting fallen tung nuts are also reported.
1275. BONTEMPO, E. 633.853.55
La coltura del ricino. Miscugli di varietà e fenomeni teratologici. (The cultivation of the castor oil plant.)
Ital. agric., 1947, 84: 461-4.
A note of the striking variations observed in cultivated *Ricinus communis* var. *sanguineus* or *major* fields in Central Italy and a plea for much more careful selection in order to attain maximum yield.
1276. DARPoux, H. 633.863.2-2.4
Puccinia carthami Cda, rouille du type brachypuccinia. (The safflower rust.)
Ann. Epiphyt., 1946, 12: 91-9, bibl. 15.
A description, with experimental technique of inoculations, of the safflower (*Carthamus tinctorius* L.) rust.
1277. DARPoux, H. 633.863.2-2.4
Essais de traitements contre la rouille du carthame. (Control trials against safflower rust.)
C.R. Acad. Agric. Fr., 1948, 34: 131-4.
Treating safflower seed with certain insecticidal dusts, e.g. copper carbonate, an organo-mercuric product, and trioxymethylene, prevented early infection by *Puccinia carthami* Cda and serious attacks were thus avoided.
1278. TUŠNJKOVA, M. M. 633.88-1.541
Direct and reversed grafting of alkaloid and non-alkaloid plants. [Russian.]
Agrobiologija, 1946, No. 4, pp. 65-9, bibl. 25.
The results of previous work on grafting herbaceous plants are reviewed, particularly with reference to grafting alkaloid-containing plants on non-alkaloid plants and *vice versa*, and the author's own work in this connexion is briefly described. He found that in grafting thorn apple on tomato, deadly nightshade on potato, and tobacco on tomato, the scions contained no alkaloid in the year of grafting but that their F_2 plants contained about half as much alkaloid as the control plants.
1279. PROKOFIEV, A. A. 633.913
Some regularities in variation of latex of herbaceous plants.
C.R. Acad. Sci. U.R.S.S., 1947, 56: 209-12, bibl. 5.
Tables show the character of age variation in the latex of milkweed (*Asclepias cornuti* Des.), kok saghyz and krym saghyz. The following variation in the latex of milkweed takes place: (a) the content of dry matter drops and the latex becomes thinner; (b) the rubber and resin content increase, rubber accumulating more rapidly than resins; (c) the amount of residue after extraction with solvents is reduced.
1280. PUPYKIN, A. F. 633.913
On increasing the rubber content of krym saghyz. [Russian.]
Agrobiologija, 1946, No. 4, pp. 143-5.
In krym saghyz the upper part of the roots contains less rubber than the lower. In the experiments described it was found that families of plants raised from such parts of the roots also differed in their rubber content, those from the uppermost part containing less than those raised from lower sections.
1281. KOLESNIK, I. D. 633.913
Results of "nest" planting kok saghyz on a field scale. [Russian.]
Agrobiologija, 1946, No. 4, pp. 127-36.
Trials of "nest" or hill planting by hand on a commercial scale (results tabulated) have shown that the advantages of this method of propagation over the usual method of planting in rows are: greater yield, better development of the roots, and a marked economy of labour particularly when harvesting the crop. (See also H.A., 17: 251 and 252.)
1282. CURTIS, O. F., Jr. 633.913: 581.192
Distribution of rubber and resins in guayule.
Plant Physiol., 1947, 22: 333-59, bibl. 14.
The author presents data showing the distribution of rubber and resins, in terms of concentration and weight, in the several portions of guayule plants of various ages and cultural histories. As normally harvested, the aerial part contributes two-thirds of the dry weight of the plant, and a greater proportion of the total rubber. Rubber and resins are concentrated in the bark. Cells in the inner xylem and pith continue to accumulate rubber, consequently the concentration of rubber in the wood appears to increase with age. Leaves and peduncles contain little rubber. Rubber contained in dead branches appears to become converted in the field to substances soluble in acetone.—Salinas, Calif.
1283. GERSONS, L. 635.937.34: 577.16
Het vitamine C gehalte van rosebottels en eenige factoren, die hierop van invloed zijn. (The vitamin C content of rose-hips and some factors which influence it.)
Meded. Direct. Tuinb., 1947, 10: 504-10, bibl. 8.
The vitamin content of rose hips is discussed, with particular reference to the interest shown in the subject in England during the war. The conditions affecting the vitamin C content are (1) geographical latitude, (2) time of ripening, (3) chromosome number, (4) taxonomy of the roses producing the hips, (5) type of chromosomes.
1284. a ANON. 633.491(85)
Potato research in Peru.
Amer. Potato J., 1947, 24: 427-9.
b BAILEY, D. L. 635.64: 632.4
Physiological specialization in *Cladosporium fulvum* [tomato leaf mould].
Abstr. in Phytopathology, 1948, 38: 2.
c BANGA, O. 635.1/7(436)
Rassenkeuze en rassenveredeling bij groentegewassen in Oostenrijk. (Selection and breeding of vegetable varieties in Austria.)
Meded. Direct. Tuinb., 1947, 10: 655-72, bibl. 7, illus.
Report on a study journey made in autumn, 1946.
d BEALE, H. P. 635.65: 632.8
The interference phenomenon between the ribgrass and tobacco-mosaic viruses in bean.
Abstr. in Phytopathology, 1947, 37: 847.

- c BEATTIE, J. H., AND BEATTIE, W. R. 635.41
Production of spinach.
Leaflet. U.S. Dep. Agric. 128, revised 1948, pp. 8.
Complete guide to cultivation.
- f BECKER, T. 581.145.1: 635.1/7
Blütenbiologische Studien an Zwiebeln, Möhren,
Sellerie und Petersilie. (The flower biology of
onions, carrots, celeriac and parsley.)
Kühn Arch., 1943/44, 60: 466-92, bibl. 9 [received
1948].
Discussion of breeding methods.
- g BONNEMAISON, L. 635.34: 632.754
Action des températures constantes ou variables
sur le développement d'un hémiptère: *Eurydema
ornatum* L. (Pentat.). (The effect of constant
or variable temperatures on the development of
the cabbage shield bug.)
Ann. Epiphyt., 1946, 12: 115-43, bibl. 52.
- h BURTON, D. F. 635.65: 632.954
Formative effects of certain substituted chloro-
phenoxy compounds on bean leaves.
Bot. Gaz., 1947, 109: 183-94, bibl. 12, being
Contr. Hull Bot. Lab. 594.
- i BUTCHER, R. W. 633.88
Atropa belladonna.
J. Ecol., 1947, 34: 345-53, bibl. 15.
Its ecology in the British Isles.
- j COCHRAN, G. W. 633.71-2.8
A chromatographic method for the detection of
tobacco-mosaic virus in juice from diseased
Turkish tobacco plants.
Phytopathology, 1947, 37: 850-1.
- k (DIRECTIE VAN DE LANDBOUW.) 632.76: 351.823.1
De Colorado-kever-wet. (The Colorado Beetle
Act.)
Meded. PlZiekt. Dienst 79, 1948, pp. 8.
- l (DIVISION OF PLANT INDUSTRY [N.S.W.]) 635.34(944)
Cabbage culture.
Agric. Gaz. N.S.W., 1948, 59: 12-17.
The whole story under N.S.W. conditions.
- m VAN EEK, T. 631.52: 633.71(73-79)
Veredelingsproblemen in de tabakskultuur in de
Verenigde Staten van Noord-Amerika. (Problems
in the improvement of tobacco growing in the
United States of America.)
Landbouw, 1947, 19: 412-16.
- n FEISTRITZER, W. 633.491-2.8
Möglichkeiten einer systematischen Resistenz-
züchtung gegen die Abbaukrankheiten der
Kartoffel. (Breeding potatoes for resistance to
virus diseases.)
Kühn Arch., 1943/44, 60: 347-57, bibl. 7 [received
1948].
- o FULTON, B. B., WHITE, R. C., AND JONES,
I. D. 635.61: 632.951
Fluorine residue on cucurbits.
J. econ. Ent., 1947, 40: 747-9, bibl. 6, being
J. Pap. N.C. agric. Exp. Stat. 261.
- p HARDY, E. 582.73
Production and uses of seaweed in the food
industries.
Canning Ind., 1948, 24: 2: 30-1.
- q IGNATIUS, J. G. W. 339.4(492): 634 + 635
Het verbruik van groente, fruit en vroege
aardappelen in Nederland. (The consumption
of vegetables, fruit and early potatoes in Holland.)
Meded. TuinbVoorlichtDienst 41, 1946, 27 pp.
- r KOPETZ, L. M. 635.1/7(436)
Gemüse-Fibel. (Vegetable growing primer.)
Österreichischer Agrarverlag Vienna, 1947, pp.
118.
A practical handbook for the Austrian vegetable
grower.
- s LAMMERS, R. P. 635.65
Kwaliteitsvraagstukken bij consumptiepeul-
vruchten. (Quality in edible legumes.)
Landbouwk. Tijdschr., 1943, 60: 34-40, bibl. 5.
- t MACGILLIVRAY, J. H. 635.61: 581.192
Soluble solids content of different regions of
watermelons.
Plant Physiol., 1947, 22: 637-40, bibl. 4.
- u MACKIE, W. W. 635.653
Origin, dispersal, and variability of the lima bean,
Phaseolus lunatus.
Hilgardia, 1943, 15: 1-29, bibl. 49, illus. [received
1948].
- v MAYNÉ, R., AND BRENÉ, R. 633.491-2.76
Notes sur la biologie du doryphore (*Leptinotarsa
deceimlineata* Say). (Notes on the biology of
the Colorado beetle.)
Parasitica, 1947, 3: 107-15, bibl. 17.
- w MAYNÉ, R., AND BRENÉ, R. 633.491-2.76
Contribution à l'étude des circonstances clima-
tiques influençant le pouvoir d'éclosion des oeufs
de *Picromerus bidens* L. (The climatic conditions
influencing the hatching of the eggs of *Picromerus
bidens* L.) [A natural enemy of the Colorado
potato beetle.] [Summaries in French, Dutch,
English and German.]
Parasitica, 1947, 3: 133-41.
- x (MINISTRY OF AGRICULTURE.) 635.25: 632.954
Weed control in onions and other horticultural
crops by sulphuric acid sprays.
Adv. Leaflet. Minist. Agric. Lond. 309, 1947, pp. 4.
- y MIRHJ, J. I. 632.952: 581.035
Effect of daylight on volatile toxicity of lime-
sulphur to fungi.
Abstr. in *Phytopathology*, 1947, 37: 845.
- z MOORE, R. J. 633.913
Investigations on rubber-bearing plants. V.
Notes on the flower biology and pod yield of
Asclepias syriaca L.
Canad. Field-Naturalist, 1947, 61: 40-6, bibl. 5,
illus.
1285. a OSWALD, J. W. 633.491-2.8
A virus causing internal necrosis in White Rose
potato.
Abstr. in *Phytopathology*, 1948, 38: 20.
- b PEAT, S., BOURNE, E. J., AND NICHOLLS, M. J. 635.656: 581.192
Starches of the wrinkled and the smooth pea.
Nature, 1948, 161: 206-7, bibl. 4.
- c PERROT, E. 633.88
*La culture des plantes médicinales. (The
cultivation of drug plants.)*
Presse universitaire de France, Paris, 1947,
382 pp., from review *C.R. Acad. agric. Fr.* 1947,
33, pp. 491-2.
- d PULLEN, W. E. 633.491
Muckland and Upland potatoes: grade quality
and wholesale price at Buffalo and Rochester.
Bull. Cornell agric. Exp. Stat. 837, 1947, pp. 40,
bibl. 1.
- e SCHREIBER, F. 635.52: 631.523
Erfahrungen über Salatzüchtung. (Lettuce
breeding.)
Kühn Arch., 1943/44, 60: 462-5, bibl. 2 [received
1948].

- f SCHULTZ, E. S., STEVENSON, F. J., AND AKELEY, R. V. 633.491-2.8
Resistance of potato to virus Y, the cause of veinbanding mosaic.
Amer. Potato J., 1947, 24: 413-19, bibl. 15.
- g TAYLOR, D. L. 632.954: 577.17
Effects of 2,4-dichlorophenoxyacetic acid on gas exchange of wheat and mustard seedlings.
Bot. Gaz., 1947, 109: 162-76, bibl. 27, being *Contr. Hull Bot. Lab.* 592.
- h TITZCK, W. 635.1/7: 632.1/8: 551.5
Beziehungen von Klima und Witterung zur Häufigkeit der Pflanzenkrankheiten in Schleswig-Holstein. (The relationship of climate and weather to the incidence of plant diseases and pests in Schleswig-Holstein.)
Kühn Arch., 1940, 54: 403-30, bibl. 48 [received 1948].
Includes observations on potatoes and vegetables.
- i VALLEAU, W. D. 633.71-2.8+2.4
Combining resistance to wildfire, mosaic, black root rot, and fusarium wilt in burley tobacco.
Abstr. in Phytopathology, 1948, 38: 27.
- j V. D. VEN, R. 633.71(492)
Tabaksteelt en fermentatieproeven in W.-Vlanderen. (Tobacco culture and curing trials in West Flanders.)
Meded. Direct. Tuinb., 1947, 10: 734-41, illus.
- k WELCH, J. E., AND GRIMBALL, E. L. 635.13: 581.162.3
Male sterility in the carrot.
Science, 1948, 106: 594, bibl. 11.
- l DE WILDE, J. 633.491-2.76
Het Coloradokeveronderzoek in Frankrijk. (French research on the Colorado beetle.)
Meded. Direct. Tuinbouw, 1947, 10: 674-80.
Report on a study journey to Paris and Versailles.
- m DE WILLIGEN, A. H., AND DE GROOT, P. W. 633.491: 581.192
Schattingsmethode voor het kaliegehalte van aardappelen door meting van het geleidingsvermogen. (Conductivity method for estimating potassium in potatoes.)
Landbouwk. Tijdschr., 1947, 59: 227-8, bibl. 2.
- n WOODWARD, E. F. 633.88
Botanical drugs—a brief review of the industry with comments on recent developments.
Econ. Bot., 1947, 1: 402-14.

FLORICULTURE.*

1286. GODFREY, W. 635.965.2
House plants [in Canada].
Publ. Dep. Agric. Canada 789, 1947, pp. 85, illus., being *Fmrs' Bull.* 145.
A short introductory section on the culture of pot plants in general is followed by concise practical notes on an impressively long list of house plants, arranged alphabetically from *Abutilon* to *Zephyranthes*.
1287. KINGDON-WARD, F. 581.9(591)
Botanical exploration in Manipur [Assam].
J. roy. hort. Soc., 1947, 73: 37-43.
The writer mentions many ornamental plants, whose cultivation he considers desirable. Parts of Manipur State have not been explored botanically, and there is still considerable scope for the plant collector.
1288. WEIGEL, C. A., AND BAUMHOFFER, L. G. 635.9: 632.6/7
Handbook on insect enemies of flowers and shrubs.
Misc. Publ. U.S. Dep. Agric. 626, 1948, pp. 115, illus.
A useful handbook starting with a chapter on how insects develop and feed, followed by an account of general plant pests. Most of the book (pp. 18-94) describes insects attacking 63 specific plants, the commoner flowering and ornamental host plants being arranged in the alphabetical order of their common names. There are chapters on insecticides—the amount, methods and times of application advisable, and on spraying and dusting equipment. The appendix of 1½ pages is a general discussion on DDT insecticides.
1289. ANON. 632.3/4: 635.936.832
Diseases of stocks.
Agric. Gaz. N.S.W., 1948, 59: 32-5.
Diseases of stocks described, with control measures, are black rot (*Xanthomonas incanae*), mosaic, crown rot (*Rhizoctonia solani*), sclerotinia blight (*Sclerotinia sclerotiorum*) and root rot (*Pythium* sp.). A number of leaf spot diseases have been recorded from stocks in New South Wales but none of them appears to be of economic importance.
1290. DIMOCK, A. W., AND BAKER, K. F. 635.939.516: 632.4
Aspects of fungicidal control of snapdragon rust.
Abstr. in Phytopathology, 1948, 38: 7.
Bordeaux mixture failed to control snapdragon rust but gave almost complete control of secondary organisms and thus prevented loss of foliage, so that the plants appeared vigorous. In contrast to bordeaux, Parzate (2 lb./100 gal. + a spreader) gave almost perfect control of rust, without host injury.
1291. PUSSARD, R. 632.76
Biologie et destruction d'*Arima marginata* F. (The biology and control of *Arima marginata*.)
C.R. Acad. Agric. Fr., 1947, 33: 634-8.
The life history of the beetle *Arima marginata* and the damage it causes are outlined. In addition to pyrethrum it attacks lavender, sage and hyssop and it is found on a number of wild *Compositae*. In control trials the best results were obtained with a dust containing 8% HCH applied in March.
1292. PASTAC, —, AND DRIGUET, V. 635.966
Un problème simplifié de macrobiotique: la prolongation de la vie des fleurs coupées. (A macrobiotic problem simplified: prolonging the life of cut flowers.)
C.R. Acad. Agric. Fr., 1947, 33: 625-6.
From certain trials described the conclusion is drawn that the life of cut flowers can be prolonged by placing the stalks in water containing calcium nitrate and silver nitrate (concentrations not stated).
1293. STOCKING, C. R. 581.11: 635.966
Recovery of turgor by cut shoots after wilting.
Plant Physiol., 1948, 23: 152-5, bibl. 6.
Failure of moderately wilted shoots to recover when placed in water is usually due to air in the xylem. If the air is removed by putting the bottom of the shoot under water under vacuum the shoot recovers when the vacuum is broken. It is suggested that this method may be of greater value to the florist than that proposed by Hamner, Carlson, and Tukey (*Science*, 1945, 102: 322-3; *H.A.*, 16: 1000).—University of California, Davis.

* See also 791, 827, 828, 1020-1026, 1512.

1294. BAKER, K. F., AND CLARK, L. H. 632.4: 635.939.38
Stemphylium leaf spot of China aster.

Abstr. in *Phytopathology*, 1947, 37: 842-3.

Stemphylium botryosum Wallr. was found causing brown circular or irregular coalescent spots 1-10 mm. across on leaves, calyces, petals, and sometimes stems of china aster. The fungus should be controlled by using ditch irrigation, and avoiding low, humid areas.

1295. TOMPKINS, C. M., AND TUCKER, C. M. 635.965.22: 632.4

Stem rot of *Dieffenbachia picta* caused by *Phytophthora palmivora* and its control.
Phytopathology, 1947, 37: 868-74, bibl. 7.

Phytophthora palmivora causes a rapid, wet decay of the stem of *Dieffenbachia picta*. The disease is favoured by high air temperatures, high humidity, poor soil drainage, excessive irrigation, and crowding of the potted plants in the greenhouse. It can be avoided by rooting cane cuttings, previously dusted with Fermate, Phygon, or Spergon, in small pots of steam-sterilized sand.

1296. RODENBURG, J. W. M., VAN GEEL, J. D. W., AND SCHOUTSEN, C. 635.944

Het trekken van bloembollen met kunstlicht. (Forcing bulbs with artificial light.)
Meded. Direct. Tuinb., 1948, 11: 25-33, bibl. 3.

Experiments on the use of artificial light for replacing fuel heating in forcing bulbs are described. Satisfactory results were obtained with approximately 100 Lux incandescent light (= about 10,000 foot-candles). It was concluded that the cost of such artificial illumination is easily compensated for by the saving in fuel expenses.

1297. GOULD, C. J., BREAKEY, E. P., AND COURTNEY, W. D. 635.944: 632.9

1948 spring recommendations for control of diseases and insects of bulbous crops in Western Washington.
Mimeograph Circ. W. Wash. agric. Exp. Stat. 138, 1948, 3 pp.

The plants mentioned are narcissus, iris, tulip, gladiolus and lilies.

1298. FURNISS, G. B. 635.938.46: 631.589

Rooting rex begonia cuttings by hydroponics.
Nat. hort. Mag., 1947, 26: 35-40, bibl. 1, illus.

A short description of a successful method of rooting leaf cuttings in a simple nutrient solution consisting of a quart of water to which a level teaspoonful of a "balanced mixture" garden fertilizer has been added. The rooted cuttings, when about 2 months old, are potted in compost, which, it is suggested, should consist of 2 parts leafmould, 2 parts sand and $\frac{1}{2}$ part loam. The method is also recommended for soft-wood cuttings of such plants as fuchsia, geranium, chrysanthemum and saint-paulia.

1299. WASSCHER, J. 635.938.46: 577.17

Het voorkomen van knopval en bloemval bij begonia's door bespuiting met groeistof-oplossingen. (Preventing buddrop and flowerdrop of begonias by spraying with solutions of growth substances.) [English summary $\frac{1}{2}$ p.]
Meded. Direct. Tuinb., 1947, 10: 547-55, bibl. 11.

A serious bud drop and flower drop, which sometimes occur in winter flowering begonias, can be decreased by 50-65% by spraying with a solution of 5-12.5 mg./l. naphthalene-acetic acid. Concentrations of more than 12.5 mg./l. caused curvature of leaves and flower stalks, and closing of the corolla.

1300. BOSHER, J. E., AND NEWTON, W. 635.944: 577.17

A new method of hyacinth propagation involving additional wounding, the use of fungicidal dusts, and a growth promoting substance.
Sci. Agric., 1948, 28: 26-9.

The mother hyacinth bulb is cut to a depth of 3 or 4 scales immediately above and around the base, and the detached scales are cut vertically into sections 1 in. wide at the base. The scale pieces are dusted with Spergon or Arasan containing a trace of naphthaleneacetic acid. They are held in moist peat or peat and sand for 3 months at 78-80° F. and are then transplanted to the same medium overlying compost in a cold frame or greenhouse. The core, consisting of three or four scales and the base, is dusted and set out in the field, where it generally produces a bulb of normal size in a single season.—Dominion Laboratory of Plant Pathology, Saanichton, B.C.

1301. BEIJER, J. J. 632.181.2: 581.112.6: 585.722

Het "spouwen" der hyacinthen. (Loose bud of hyacinths.) [English summary 2 pp.]
Meded. Landbhoogesch. Wageningen, 1947, 48: 185-225, bibl. 19, illus.

The term "loose bud" is applied to the falling out of the hyacinth inflorescence shortly before flowering time. The trouble occurs in early spring, chiefly in the well-known commercial varieties Prince Bismarck (blue) and Pink Pearl (pink). The break in the flower stalk is preceded by events which occur towards the end of December or beginning of January. It is caused by the infiltration of sap longitudinally and laterally into the stalk, and as the inflorescence is pushed upwards by the growth of the sheath of leaves the stalk breaks across and the inflorescence falls out. It appears to be favoured by early root development and excessive root activity. The bulb is not affected adversely and its increase in weight is normal.

1302. MACLEAN, N. A. 635.944: 632.4

Rhizoctonia rot of tulips in the Pacific Northwest.

Phytopathology, 1948, 38: 156-7.

A top rot bulb infection, caused by *Rhizoctonia solani*, in a greenhouse planting of William Pitt tulips destroyed or severely injured 7,000 out of 15,000 bulbs.—State College of Washington, Pullman.

1303. TOMPKINS, C. M., AND HANSEN, H. N. 635.944: 632.4

Cyclamen petal spot, caused by *Botrytis cinerea* and its control.

Phytopathology, 1948, 38: 114-17.

Prevention of petal spot of Persian cyclamen (*Cyclamen persicum* Mill.) in greenhouses in the San Francisco Bay region of California would appear to depend on daily closing the top ventilators of the greenhouse at dusk, leaving the side ventilators wide open, and turning on two steam pipes to provide drier air conditions during the evening hours.—California Agricultural Experiment Station, Berkeley.

1304. BOWLES, E. A. 635.944

***Anemone hortensis* and *A. pavonina*.**

J. roy. hort. Soc., 1948, 73: 57-70, bibl. 42, illus.

The author ascribes the confused nomenclature of these anemones to the failure of some botanists to observe the behaviour of plants in the field and of others to label their specimens properly. Recent views are set out, with the older synonyms.

1305. LA RUE, C. D., AND CURRY, L. A. V. 635.944

Regeneration in *Gladiolus*.

Abstr. in *Amer. J. Bot.*, 1947, 34: 586.

Experiments indicated that the best regeneration of cut corms occurred when these were quartered by radial cuts.—University of Michigan.

1306. LEBEAU, F. J., AND REYNOLDS, F. J. 632.4: 635.944

Treatment of lily bulbs for black scale control.

Phytopathology, 1947, 37: 801-8.

Phenyl mercuric triethanol-ammonium-lactate (Puratized Agricultural Spray) effectively eliminated *Colletotrichum*

lilii from infected lily bulb tissues in laboratory tests without severe injury to the host tissue. At concentrations of 1-1,000 to 1-2,000 of the 10% preparation and with treatment for 24 hours it gave practical control of bulb-borne infection in the field during a two-year trial.—Louisiana Agricultural Experiment Station.

1307. ROLAND, G. 635.944: 632.8
La lutte contre les viroses du dahlia. (The control of dahlia virus diseases.)
Parasitica, 1947, 3: 163-4.

An account of sanitary measures recommended for the control of the three viruses affecting dahlia, with the exclusion from the greenhouse when sets are being produced, of other species of plant which are hosts of two of the viruses attacking dahlia, viz. tomato spotted wilt and cucumber mosaic.

1308. HUBER, G. A., AND GOULD, C. J. 632.4: 635.944
Sclerotium delphinii Welch on scilla.
Phytopathology, 1948, 38: 82-5.

The symptoms on *Scilla sibirica* were yellowing and drying up of leaves and wilting of blossoms.

1309. LOPEZ, A. C. 577.17: 635.944
Estudios fisiologicos relacionados con las fitohormonas en *Sternbergia lutea* Gawl. et Ker. (Physiological studies on the phytohormones in *Sternbergia lutea*.) [English summary $\frac{1}{2}$ p.]
Anal. Inst. españ. Edafol. Ecol. Fisiol. veg., 1947, 6: 325-432, bibl. 143.

Seasonal variations in the concentration of free and bound auxins were followed in the various parts of *Sternbergia lutea*. Bound auxins disappear at the end of the summer resting phase, when oxidative enzymes increase. Of various chemical treatments intended to hasten or delay budding, the application of α -naphthaleneacetic acid was effective only after the next growth cycle had been completed; the subsequent budding was delayed 49 days.

*Citrus.**

1312. HONEYFIELD, A. H. 634.3(794)
California's citrus industry.
Orchard. N.Z., 1947, 20: 9: 8-9.

A short account of citrus culture in California, comparing it with that of New Zealand.

1313. CARDOSO COSTA, C., AND VITAL RODRIGUES, R. 634.3(469)
Breve reconhecimento da região produtora de laranja do concelho de Tondela. (A short account of the citrus producing region of the Tondela district.)
Bol. Junta nac. Frutas, Lisbon, 1947, 7: 135-47.

The citrus producing zone in the Beira Alta province of Portugal is described. Although limited in area, its products are excellent and Beira Alta oranges are harvested when other varieties are scarce.

1314. HARDING, P. L. 634.3(759)
Citrus at its best.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 858-62, bibl. 1.

The author examines the relationship between maturity and quality in citrus fruit grown in Florida. After discussing the ripening process he touches briefly on the following, among other subjects: vitamin C content of juice, influence of rootstocks, citrus varieties grown, the effect of fertilizers, mineral deficiencies, drought.

* See also 791.

Growth substances did not facilitate propagation, but in water cultures roots were induced to branch. Parthenocarpic fruits were produced by the application of β -naphthoxyacetic acid in lanoline paste.—Madrid.

1310. HANNIBAL, L. S. 585.724: 635.944
Boöphone and Brunsvigia [Amaryllids].
Nat. Hort. Mag., 1947, 26: 7-9, bibl. 1, illus.

A short description of *Boöphone disticha* and of some *Brunsvigia* species, all South African Amaryllids.

1311. a BALKENENDE, P. G. 635.944
Het forceren van tulpen. (Forcing tulips.)
Tuinbouw, 1947, 2: 301-4.

- b HALLEMANS, A. 635.944: 632.76
Het leliehaantje *Crioceris lilii* Scop. (The lily beetle.)
Cultuur Hand., 1947, 13: 10: 21.

- c HUME, H. H. 635.976.4
Evergreen hollies native in the United States.
Nat. hort. Mag., 1947, 26: 143-79, illus.

- d JAMES, E. R. 635.937.36
The modern sweet pea.
J. roy. hort. Soc., 1948, 73: 95-102, illus.

- e SCHNACK, B., AND FERNANDEZ, O. 635.936.832: 581.175.11
Nuevos resultados en la genética de los pigmentos florales del aleli. (Fresh data on the inheritance of flower colour in stock [*Matthiola incana*].)
Rev. Invest. agric. B. Aires, 1947, 1: 103-12, bibl. 3.

- f SEVERIN, H. H. P. 632.8: 635.938.422
Viruses that induce breaking in color of flower petals in pansies and violas.
Hilgardia, 1947, 17: 577-94, bibl. 19, illus. partly in colour.

SUB-TROPICAL CROPS.

1315. BATTIATO, C. 634.3: 581.46
L'andromonoicismo nel gen. citrus. (Andromonoicism in citrus.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941, 16: 103-24, bibl. 44 [received 1948].

According to the author's own observations the production of plants bearing male flowers only is limited to *C. medica*, *C. limonum*, *C. limetta* and *C. trifoliata* and is inherited.

1316. BATTIATO, C. 581.48: 634.3
Sulla origine delle spine delle *Aurantaceae* e sul significato dei casi di formazione di gemme dalle spine stesse. (The origin of thorn in the *Aurantaceae* and on the significance of the formation of buds by the thorns themselves.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941, 16: 11-18, bibl. 9, illus. [received 1948].

From the observations of himself and other workers the author concludes that citrus thorns do not properly form part of but are appendices to the stem and that on occasions thorn, bud scale and bud possess a common vascular system and contiguous parenchymatous tissues. From which it would not appear improbable that some of the embryo cells destined for the formation of the contiguous bud can—for reasons as yet unknown—remain enclosed in the thorns and later, developing under particular conditions and stimulation, give rise to buds. In such conditions, which are abnormal, the thorn would assume certain of the functions of the leaf axis.

1317. BATTIATO, C. 634.3: 575.22
Su alcuni casi di teratologia florale nel gen. citrus.
(Certain flower abnormalities in lemon, orange and citron.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941,
16: 21-6, bibl. 10, illus. [received 1948].
- The phenomena observed were (1) Excessive number of petals in lemon and bitter orange. (2) Transformation of sepal into leaf in lemon. (3) Congenital atrophy of gynaeceum in several *Citrus* spp. (4) Atrophy of pistils, transformation of stamens into petals, distortion of pistils, prolongation of floral axis in orange *C. bigaradia* var. *dulcis*. (5) Prolongation and floral axis in orange.
1318. CARRANTE, V. 581.175.11: 634.31
Sulle pigmentazioni delle arance Italiane. (Pigmentation of Italian oranges.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941,
16: 193-247, bibl. 52 [received 1948].
- The author discusses the biological and economic importance of the pigmentation in Italian orange varieties, tested at Acireale. The carotinoid pigment figures are very much higher in the Italian oranges than in those for American oranges analysed in the U.S.A., which indicates a marked superiority of the Italian oranges in vitamin A content. The anthocyanin pigments will be discussed in subsequent papers.
1319. PATANÈ, G. 634.31: 581.175.11
Sulla sostanza colorante delle arance sanguigne. (Pigments in the Sanguigno orange.)
Ann. Staz. sper. Frutt. Agrum. Acireale, 1948,
17: 1-11, bibl. 17.
- A note of methods of extraction of the anthocyanin pigments in the Sanguigno blood oranges. It is thought that these tests should form the basis of quick maturity tests.
1320. NOTTAGE, I. L. 634.3-1.541.11
The propagation of citrus trees.
N.Z. J. Agric., 1947, 75: 403-9.
- In New Zealand the most popular stocks are Island sweet orange seedlings. Citronelle (rough lemon) and *Poncirus trifoliata* (deciduous dwarfing) are used less and sour (Seville) orange is uncommon. Rough lemon produces mostly "nucellar" seedlings; they are of very uniform type and generally grow more vigorously than plants from sexually-produced embryos. Island orange seedlings are rather more variable and culling must be correspondingly severe. The raising of seedlings and subsequent budding operations are described. A table shows the pests and diseases of seedlings, symptoms, control measures and when to spray.
1321. TAI, E. A. 634.3-541.5
Producing good citrus nursery trees. II. Budding citrus seedlings and their subsequent treatment.
Ext. Circ. Jamaica Dep. Agric. 6, 1947, pp. 15, illus.
- This circular is a sequel to No. 5 which described the raising of citrus seedlings for rootstocks (see *H.A.*, 17: 2480). The subject is treated under the following heads: scion selection, preparation of rootstock, budding, forcing bud growth, training, etc.
1322. SERVICE DE L'HORTICULTURE, RABAT. 634.31-1.541.11
Comparaison de la vigueur chez les bigaradiers. (Comparison of vigour in seedling sour orange.) (Mimeo.) *C.R. Serv. Hort. Rabat* 4, 1947, pp. 11.
- Trials, in which sour orange seedlings were worked with a number of orange scions and the subsequent growth noted at different stations in Morocco, showed that differences in growth were in general of a uniform and predictable nature and that sour orange seedlings submitted to normal nursery practice afford, by the time they are grafted, a reasonably homogeneous rootstock. This agrees with the work of Webber and others in the U.S.A.
1323. BLONDEL, L. 634.31-1.541.44
Le surgreffage des orangers adultes par la greffe de côté sous écorce. (Top-working full-grown orange trees by side grafting.)
Fruits Primeurs, 1948, 18: 12-14, illus.
- A method of side rind grafting is described and illustrated which is strongly recommended by the author to those wishing to top-work their orange trees. When carried out under good conditions the method gives 80% success. In case of failure the grafted trees, not being cut back, continue to bear and, at the same time, are not subject to sun damage. In these ways the method is superior to crown grafting.
1324. ANON. 634.31-1.541.11-1.542
Age decline: susceptibility of [orange] trees on citronelle stock.
Citrus News, 1947, 23: 57, illus.
- A short note on the possibilities of skeleton pruning for the treatment of declining trees.—N.S.W., Australia.
1325. STEVENSON, S. A. 634.334-1.543
The effect of seasons on growth of citrus.
Punjab Fruit J., 1947, 11: 245-52, bibl. 6.
- An account of a small-scale pot experiment with shaded and unshaded rough lemon seedlings. It is concluded that lack of shade resulted in defoliation to the extent of about 12% and that root growth is hindered by failure to provide shelter during monsoons.
1326. CARRANTE, V. 634.3-1.8
Esperienze permanenti di concimazione agli agrumi, primo biennio di osservazioni. (Observations on the first two years of a permanent manurial experiment with citrus.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale, 1941,
16: 137-80 [received 1948].
- Full detail is given of layout and nutrients used in extensive pot trials at SS. Salvatore and field trials on the Galatea estate with a number of Sicilian oranges, the Palermo mandarin and the Monachello lemon. The indications given by the first two years' work are set out.
1327. CARRANTE, V. 634.3-1.8
Secondo contributo alle esperienze permanenti di concimazione degli agrumi (quinquennio 1942-46). (A second report on the permanent citrus manurial trials, years 1942-1946.) [English summary 1½ pp.]
Pubbl. Staz. sper. Frutt. Agrum. Acireale 2, 1948 (7), pp. 44.
- Whereas the first report [see abstr. 1326] was mainly concerned with the pot trials on oranges, lemons and mandarins at SS. Salvatore, this deals with the field trials instituted at Giardino Galatea in 1939, and, despite the extreme difficulties occasioned by the war, the author is able to come to certain tentative conclusions which are set out below. Manuring should be done annually. Nitrogen is indispensable and should be given half in organic, half in inorganic form. There was a very high correlation between N given and crop produced, viz. $r=0.76$. The effect of K application in large amount was to induce finer fruit texture. As regards relation to yield $r=0.41$. P appeared to affect yield least ($r=0.10$) but did have some limited effect on vitamin C content. Organic manure applied yearly, in amount not exceeding 60 kg. for a 7-year-old tree, results in good yields, but if given at the rate of 120 kg. or more both yield and quality deteriorate. The ratio 1:1:1 between N.P.K. (potash and phosphate) was found to be the most effective, provided each plant does not receive more than 100 g. If the total amount given is more than this, then the proportion of N should be increased and the ratio should

be 3.2 : 0.7 : 1.4, and in addition 30 kg. Ca, 0.2 kg. S and 30 kg. organic manure should be applied per plant. The application of fertilizers tended in general to increase the alkalinity of the soil. After 7 years of yearly applications the N in the soil had increased by 56.48%, the P by 61.72%. Finally it became evident that high manuring is not economic in times of low citrus prices.

1328. CHAPMAN, H. D., BROWN, S. M., AND RAYNER, D. S. 634.31-2.19: 631.83
Effects of potash deficiency and excess on orange trees.
Hilgardia, 1947, 17: 619-50, bibl. 24, illus.
partly in colour.

Orange trees can apparently secure ample potash from a very low maintained supply. At concentrations ranging from 2 to 3 p.p.m. potassium, under the conditions of this experiment, no signs of potash deficiency developed. At concentrations of 390 p.p.m. potassium (ranging from 350 to 400 p.p.m.), the trees were injured. At 117 p.p.m., no ill effects were seen. Leaves of comparable age were found to reflect the potassium status of the culture medium very well. The range between acute potash deficiency and excess was from about 0.10% to 3.8% potassium on a dry-matter basis. [From authors' summary.]

1329. HAAS, A. R. C. 634.3-2.19: 631.811.6
Magnesium deficiency and its effect on citrus.
Calif. Citrogr., 1948, 33: 134, 146-50, bibl. 9, illus.

A popular article on a subject that is affecting an increasing number of orchards in California. The symptoms are described and illustrated. Healthy, mature citrus leaves from Californian orchards usually contain 0.3% or more of magnesium (on dry-weight basis). Treatments are suggested for trial in orchards in which leaves show magnesium deficiency symptoms.

1330. PURVIS, E. R., AND DAVIDSON, O. W. 631.416.7: 631.811
Review of the relation of calcium to availability and absorption of certain trace elements by plants.
Soil Sci., 1948, 65: 111-15.

Included in this review are references to deficiencies of copper and zinc in citrus in relation to the calcium content of the soil.

1331. BRUERE, G. M., AND EVERETT, P. 634.3-1.43
Soil moisture in Kerikeri citrus orchards.
N.Z. J. Agric., 1947, 75: 487-8.

The fifteen-year-old trees showed the effects of dryness under any one system of orchard practice to a greater extent by defoliation and dropping of young fruits than did the eight- to nine-year-old trees, though the soil moisture was similar. On the dates when the topsoils reached their wilting points the young orchards under permanent cover crop showed greater defoliation than did those that were cultivated. In these young orchards, however, the topsoils under permanent cover crop did not reach their wilting points so quickly as did the cultivated topsoils. [From authors' conclusions.]

1332. GOUDIE, A. G. 634.3-1.67
Systems of spray irrigation. Permanent and portable sprinklers and jet types [for citrus orchards].
Citrus News, 1947, 23: 167, 173.

Short descriptions are given of: permanent sprinklers; sprinklers on portable pipes; jets on long lengths of small diameter pipes. It is stated that the cheapest spray system costs over £30 per acre to instal, to which must be added pumping costs of approximately £2 per acre per annum. Spray irrigation is specially suited to light, undulating soil because watering is accurate and irregularity of contour

causes no extra costs. Contour irrigation is also described and compared with spray irrigation and the furrow method at present used.—Victoria, Australia.

1333. BENTON, R. J. 634.3-1.67
Irrigation of citrus trees.
Agric. Gaz. N.S.W., 1948, 59: 30-1*

Recommendations for irrigating citrus trees include the following: Before irrigating, numerous soil auger tests should be made to determine whether the soil is moist at a depth of a few feet. If a wet soil exists continuously at a certain average depth, light irrigations which cannot reach that depth should be given. These light applications should not be made before it is apparent, early in the morning, that the foliage is approaching a wilting stage. The regularity of soil surface, grade and permeability of soil types will indicate whether irrigation by spraying or gravitation is necessary. If by gravitation, then careful grading of the soil surface and accurate planning of the fall are essential to ensure even saturation.

1334. STEWART, W. S., AND KLOTZ, L. J. 634.31: 577.17
Some effects of 2,4-dichlorophenoxyacetic acid on fruitdrop and morphology of oranges.
Bot. Gaz., 1947, 109: 150-62, bibl. 12, being
Pap. Calif. Citrus Exp. Stat. 569.

In these experiments 2,4-D was used in the form of aqueous spray. Applied to Valencia oranges at full bloom, sprays delayed blossom drop without increasing fruit set. Applications a month later delayed the June drop of Washington Navels without increasing final yield. Applied to Valencias carrying mature fruit the sprays decreased preharvest drop very considerably, even when drop had already become severe. At higher concentrations spray applied in May induced the formation of more or less normal seeds in Navels; in both varieties the rind was thickened and the fruit distorted.

1335. HALL, E. G. 634.3-1.56
The handling of fresh citrus fruits.
Food Pres. Quart., 1947, 7: 39-44.

An account of the measures taken to reduce wastage from the time of harvesting to packing. Methods used in Australia and in the United States are discussed; they include the use of fungicides and waxes.

1336. CARRANTE, V. 634.31-2.111
La gelata degli aranceti nel 1940. (Spring frosts of 1940 in Sicilian orange groves.)
Boll. R. Staz. sper. Frutt. Agrum. Acireale 74, 1940, pp. 24 [received 1948].

A complete picture of frost damage in a citrus orchard—dried up leaves, split bark, etc.—was given by the orange groves of eastern Sicily after the severe frosts of 9-11 March, 1940. The author gives guarded advice for renovation and discusses all known methods of preventing such occurrences. He comes to the conclusion that in view of their rarity control measures are unlikely to be economic.

1337. CARRANTE, V. 634.31-2.111
La concimazione degli agrumeti in rapporto alla gelata del 1940. (Manurial treatment in frost damaged orange groves.)
Boll. R. Staz. sper. Frutt. Agrum. Acireale 76, 1940, pp. 7 [received 1948].

While it is impossible to be precise without knowing the exact circumstances of damage and fertilizer needs, the author considered that a formula based on the following mixture might afford a working basis:—For each adult damaged tree give superphosphate 2.5 kg., sulphate of ammonia 0.400-0.600 kg., and sulphate of potash 0.300-0.500 kg. Where farmyard manure is available (40-50 kg.) add to this 2.3 kg. superphosphate and 0.250-0.300 kg. nitrate of lime.

1338. ANON. 634.3-2.111
Frost protection.
Citrus News, 1947, 23: 141.
"A preliminary test by the C.S.I.R. has shown that it is possible with the use of a 21-ft. diameter fan to raise the temperature by 2° F. over 3 acres, or by 8° F. over one-third of an acre. With a 12-ft. fan the improvement was 2° F. over two-thirds of an acre. The movement of the fans mixed the warmer air from 10 diameters above them with the colder air at ground level." Mention is made of the suggestion that infra-red lamps be used for protecting citrus from frosts. The value of the method is questioned.—Victoria, Australia.
1339. FAWCETT, H. S., AND KLOTZ, L. J. 634.3-1.541.11: 632.19
Bark shelling of trifoliolate orange.
Calif. Citogr., 1948, 33: 230.
A small proportion of the citrus budded on trifoliolate stocks in California show marked dwarfing of the trunk and crown. The name exocortis is proposed for this condition, as the outer bark of the stock peels off in narrow dry strips.
1340. FAWCETT, H. S., AND CALAVAN, E. C. 634.334-2.8
Wood pocket, a newly reported disease of lemons.
Abstr. in *Phytopathology*, 1947, 37: 843.
In wood pocket (ligno-cortosis) a defect or break in the bark is accompanied by discoloured wood underneath. Later discoloured regions are seen in a tangential cut as an irregular pattern of gum-filled tissue, darkly dotted on a lighter coloured surface. Trees propagated by buds from apparently healthy branches of diseased trees developed wood pocket in 6 years; these, when top-worked to various citrus have transmitted the leaf symptoms (variegation) to healthy scions of several varieties of lemon. The occurrence of leaf symptoms in seedlings coupled with a capacity for transmitting to healthy scions, indicates the presence of a virus.
1341. CALAVAN, E. C. 634.334-2.8
The incidence and development of lemon shell bark.
Abstr. in *Phytopathology*, 1947, 37: 843.
Two types of pre-lesion symptoms of shell bark have been found about midway through the bark of mature Eureka and Lisbon lemon trees. Fungi are apparently of little importance in the incidence of shell bark, but may accelerate lesion development.
1342. McALPIN, D. M., AND OTHERS. 634.3-2.8
"Bud-union decline" disease in citrus trees.
J. Dep. Agric. Vict., 1948, 46: 25-31, bibl. 4.
1. "Bud-union decline" of citrus trees was first noticed in Victoria in 1941, and since that date has spread rapidly.
2. Trees suffer first from blockage and death near the bud-union of the phloem, which carries food from the tops to the roots, then from loss of starch in roots, decay of rootlets and roots, general yellowing of leaves, and signs of ill-health in the head of the tree. Some trees collapse and die suddenly; others persist in a state of poor health for some years.
3. Sweet-orange varieties on sour-orange rootstock, and grapefruit on the same stock, are the most important commercial stock-scion combinations which seem to be affected by this disease, although buds from non-susceptible combinations may carry the disease.
4. Growers are advised not to plant trees with these susceptible combinations. Where areas are already planted, interplanting with resistant combinations is recommended.
5. Budding experiments; study of the death of the phloem cells, the occurrence, spread of the disease and lack of fungal or bacterial disease, point to the disease being virus in nature. [Authors' summary.]
1343. SCHNEIDER, H., BITANCOURT, A. A., AND ROSSETTI, V. 634.31-2.8
Similarities in the pathological anatomy of quick-decline and tristeza-diseased orange trees.
Abstr. in *Phytopathology*, 1947, 37: 845-6.
Radial sections of the phloem at the bud union in mature trees suffering from the two diseases have been compared. No differences in the anatomy of the trees were noted.
1344. BRICHET, J. 634.3-2.8
En attendant le "Quick Decline" ou Tristeza. (Regraft and so avoid tristeza.)
Fruits Primeurs, 1948, 18: 2-6, bibl. 1, illus.
In the anticipation that quick decline may in time spread to North Africa it is suggested that the risk should be guarded against in advance by grafting resistant rootstocks on to existing citrus trees, most of which are at present worked on sour orange, which is susceptible to this disease. To achieve this change-over it is proposed that the type of approach graft described and illustrated by R. W. Hodgson in *Circ. 273 Calif. Agric. Exp. Stat.* (1923) be used. Where trees in North Africa are already failing from various causes and their bark is so damaged as to endanger the flow of sap, then it is suggested that bridge-grafting (also described in the above circular) should be exploited.
1345. FREZAL, P. 634.3-2.8
Graft incompatibility, Tristeza et Quick Decline menacent l'agrumiculture Nord-Africaine. (Graft incompatibility, tristeza and quick decline, a menace to citrus growing in North Africa.)
Fruits Primeurs, 1948, 18: 7-11.
The author calls attention to the infectious degeneration of citrus, known by the above names, and the danger of its spreading to the orange plantations of Mediterranean countries, most of which are grafted on sour orange, which is susceptible to the malady. The history of the disease is traced and the present state of knowledge of its nature and variations reviewed. Advice is given on how to delay and, if possible, prevent the introduction of the disease into North Africa.
1346. FAWCETT, H. S., AND WALLACE, J. M. 634.31-2.8
Symptomless hosts of quick decline virus.
Calif. Citogr., 1948, 33: 182, bibl. 5.
Buds taken from apparently healthy Valencia and Navel oranges on sweet orange stocks growing near trees showing quick decline were budded on healthy Valencias on sour orange stocks. Quick decline developed in half the trees inoculated on the scion, and in one in six of those inoculated on the sour orange stock. This indicates that oranges on sweet orange roots can serve as symptomless carriers of the virus.—University of California Citrus Exp. Stat.
1347. FAWCETT, H. S., AND KLOTZ, L. J. 634.3-2.8
Stubborn disease [of citrus].
Calif. Citogr., 1948, 33: 229.
This disease (see *ibid.*, 1944, 20: 146-7 and 168-9; *H.A.*, 14: 1322) is caused by a virus; there are indications that it is spread by an insect vector. Infected trees should be replaced.—University of California Citrus Exp. Stat.
1348. RHOADS, A. S. 634.3-2.4
Clitocybe root rot of citrus trees in Florida.
Phytopathology, 1948, 38: 44-61, bibl. 21, illus.
Clitocybe tabescens (Scop. ex Fr.) Bres., the cause of mushroom root rot in Florida citrus groves, usually attacks the root crown and adjacent portions of the root system, often killing the taproot and many of the lateral roots, and sometimes causing a butt rot of the trunk before the top shows any appreciable evidence of decline. It is most frequent on well-drained, droughty, sandy land, especially

where oak and other hardwood trees have recently been cleared. Surgical treatment, either alone or with exposure of the root crowns to aeration and drying, has given marked success. Subsequent mounding of the soil around the bases of treated trees to stimulate the development of new roots is recommended.

1349. RUGGIERI, G. 634.3-2.4
Il mal secco, il marciume radicale e le malattie a processo gommoso. (Mal secco, root rot and gummosis in relation to the present crisis in Sicilian citrus culture.)
Reprinted from *Citrus*, 1946, 15 pp. [received 1948].

These three diseases and their effect on citrus growing in Sicily are described. Mal secco, caused by *Deuterophoma tracheiphila* Petri, is the most serious. It cannot be satisfactorily controlled by spraying and measures recommended are the removal and destruction of infected branches and rootstocks, deep cultivation and manuring, preferably in summer rather than in winter and spring, and the use of resistant varieties.

The root rot prevalent in Sicily is not caused by a parasite. It occurs particularly in citrus groves on wet clay soils with deficient aeration of the subsoil, so that control consists in adequate drainage, rather wide spacing, and thinning the branches. Irrigation should be sparing, and manures should be applied at the end of winter and early spring (not in autumn), weeding must be thorough and carried out between the times of irrigation.

Gummosis is due to various causes, e.g. parasitic diseases and to unfavourable cultural and environmental conditions. Recommendations are to cut out affected cortex to a depth of about 2 cm. and then pare away the underlying discoloured wood, and to thin out the branches of seriously affected trees.

1350. RUGGIERI, G. 634.3-2.4
Il "mal secco" fra gli agrumeti di Fondi.
(Mal secco in the citrus groves of Fondi.)
Reprinted from *G. Agric.*, 1947, No. 24, 7 pp.

Mal secco has not yet been recorded with certainty in Fondi, but it is already destructive in the neighbouring district of Monte San Biagio, and it is probably already in Fondi but confused with other diseases with similar symptoms. The disease is discussed in relation to meteorological and cultural conditions in Fondi as compared with those of Sicily, and control measures are outlined. A plea is made for concerted action against the disease, particularly in avoiding the introduction of the sour orange from the south where the disease is prevalent, and in the establishment of suitable nurseries for local needs.

1351. CARRANTE, V., AND RUGGIERI, G. 634.3-2.48
Esperienze di inoculazione della *Deuterophoma tracheiphila* Petri. (Inoculating *Deuterophoma tracheiphila* into citrus trees.) [English summary ½ p.]
Reprinted from *Ann. Sper. agr.*, 1947, 1 n.s.: 463-71, bibl. 6, being *Pubbl. Staz. sper. Fruttic. Agrumic. Acireale* 4.

Experiments have shown that "mal secco" which shows slow progress symptoms and the more rapidly progressing "mal nero" are not caused by two forms of *Deuterophoma tracheiphila* differing in virulence. In mal nero the innermost wood is attacked and external symptoms may not show for a long time. It is only when the mycelium attacks the sapwood that the disease makes rapid progress with serious results. In infections arising from bitter orange rootstocks the Monachello lemon does not present much resistance to the fungus, and the same is true when the parasite is directly inoculated into the basal portion of a Monachello scion.

1352. GOIDANICH, G., AND RUGGIERI, G. 634.3-2.48
Recenti osservazioni sulla biologia della "*Deuterophoma tracheiphila*" Petri e considerazioni sulla eziologia del "mal secco" degli agrumi. (The biology of *D. tracheiphila* Petri and a discussion of the cause of mal secco in citrus.)
Rend. Accad. naz. Lincei, 1947, 3, series 8, pp. 395-402, bibl. 18.

Un reperto di sistematica micologia di eccezionale interesse fitopatologico. (A discovery in systematic mycology of particular phytopathological interest.)

Reprint from *Ricerca sci. Ricostr.*, 1947, 17, No. 7-8, 7 pp.

Una rapida riproduzione sperimentale del "mal secco" degli agrumi. (A quick method of producing mal secco in citrus.) [English summary ½ p.]

Reprint from *Ann. Sper. agr.*, 1947, 1, no. 1, 5 pp.

Three papers dealing further with *Deuterophoma tracheiphila*, the cause of mal secco (see above, no. 1351). The first is a description of the fungus (illustrated) and its infection of the host plants. The second discusses the morphology and systematics of the fungus. The third is an account of inoculation experiments in which fungus spores were injected into the wood of young, sour orange trees, the first symptoms appearing in 19 days.

1353. RUGGIERI, G. 634.3-2.48
Fattori che condizionano o contribuiscono allo sviluppo del "mal secco" degli agrumi e metodi di lotta contro il medesimo. (Causative or contributing factors to the spread of citrus "mal secco" and methods of control.) [English summary 1 p.]
Reprinted from *Ann. Sper. agr.*, 1948, 2 (n.s.): 1-51, bibl. 52.

The factors affecting the course of the disease are discussed. The main factors are temperature, humidity and sometimes frost, and subsidiary are (1) wind (disseminating the fungus spores and causing wounds), (2) the chemical composition of certain argillaceous soils, (3) the variety and age of the tree, (4) the season when the young trees are planted and the choice of trees to be planted, (5) the rootstock's influence on predisposition or resistance of the scion, (6) fertilizers, deep ploughing and herb associations, (7) forcing the trees for a "verdelli" crop is detrimental. Control measures involve spraying the nursery trees and the young planted trees in the early years with a fungicide, and surgical therapy. Reference is made to the use of resistant species and varieties.

1354. HEPBURN, G. A. 634.3-2.7
Insect pests of citrus in the eastern districts of the Cape Province. 1. False codling moth (*Argyroplote leucotreta*), 2. Fruit-fly (*Ceratitis capitata* and *Pterandrus rosa*), 3. Citrus thrips (*Scirtothrips aurantii*), 4. Ant control.
Citrus Gr., 1947, No. 162, pp. 9-11; No. 164, pp. 1-3; No. 165, pp. 1-3; No. 167, pp. 9-10, bibl. 2.

The first three articles contain short accounts of the life histories of the false codling moth, fruit-flies and citrus thrips and the control measures which can be taken against them. The fourth is mainly devoted to instructions for making tree collars of malthoid, dressed with corrosive sublimate and shellac, which are recommended as giving better service than sticky bands. The commonest ant in the eastern districts is *Anaplolepis custodiens*.

1355. EBELING, W. 634.3-2.752
DDT preparations to control certain scale insects on citrus.
J. econ. Ent., 1947, 40: 619-32, bibl. 7.

The addition of DDT to light medium oil generally improved control of California red scale, *Aonidiella aurantii*; a spray

of 3% kerosene containing 9.4% DDT was generally even more effective, and its value was increased by the addition of 1% aluminium stearate. DDT is less effective against the yellow scale, *A. citrini*. The DDT-kerosene spray did not affect fruit quality, nor did it increase the incidence of water spot, generally aggravated by oil sprays.—Calif. Citrus Exp. Stat.

1356. LINDGREN, D. L., AND GERHARDT, P. D. 632.752: 632.944

The response of California red scale to fumigation with ethylene dibromide and ethylene dibromide-HCN.

J. econ. Ent., 1947, 40: 680-2, bibl. 7, being *Pap. Calif. Citrus Exp. Stat.* 567.

Ethylene dibromide as a fumigant gave an excellent kill of adult females of the California red scale on grapefruits, whether these were resistant to HCN treatment or not, though they survived long enough to reproduce. The use of small doses of HCN either before or with the ethylene dibromide greatly reduced the efficacy of the latter.

1357. MAY, A. W. S. 634.3-2.752
Red scale [*Aonidiella aurantii*] control.
Qd agric. J., 1947, 65: 311-4.

On most sorts of citrus in Queensland the writer recommends that red scale be controlled by fumigation followed in 2 or 3 weeks by a white oil spray. For early varieties treatment should begin in December; late varieties may be treated, if necessary, in March.

1358. ANON. 634.3-2.752
Red scale (*Aonidiella aurantii*).
Agric. Gaz. N.S.W., 1948, 59: 43-5.

The red scale is present in all the main citrus-growing areas, and is the most injurious scale pest of citrus trees in the inland districts and some parts of the coastal regions of New South Wales. It also attacks mulberry, willow, holly, rose, grape, privet, etc. Control measures by spraying (red or white oils) and fumigation (with hydrocyanic acid gas) are described. Insect parasites of the scale include *Aphytis chrysomphali* and *Aspidiotiphagus australiensis*. Predators include the steely-blue ladybird, *Orcus calybeus*, and *O. australasiae*. These parasites and predators are only of limited value in reducing scale infestations.

1359. ANON. 634.3-2.752
White wax scale (*Ceroplastes destructor*).
Agric. Gaz. N.S.W., 1947, 58: 634-5.

To control the citrus white wax scale spraying with a white oil emulsion at a dilution of 1 gal. of oil to 40 gal. of water (16 fluid ounces to 4 gal.), about the second and third week in December in lowland areas and a little later in higher areas, is recommended. Where the oil spray has been omitted it may be necessary to use a soda spray (washing soda 1 lb. to 4 gal.) when the scales are still young, or at a higher concentration when they are older.

1360. GUTIERREZ, R. O. 634.3-2.651.3
El nematode de las raicillas de los citrus *Tylenchulus semipenetrans* en la Republica Argentina. (A nematode attacking the roots of citrus in Argentina.)
Rev. Invest. agric. B. Aires, 1947, 1: 119-46, bibl. 11.

The author gives an illustrated account of the biology of the nematode *Tylenchulus semipenetrans*. The adult female is a parasite on the roots of *Citrus* spp. and *Poncirus trifoliata* in Argentina. A key is given for the identification of several nematodes common in citrus soils in Argentina.

Miscellaneous fruits:

1361. LI, LAI-YUNG. 634.1/8(51)
Some indigenous fruits found in South-east China.
Orchard. N.Z., 1947, 20: 6: 4-7, bibl. 13.

Notes on the cultivated indigenous fruits in South China

including litchi (*Litchi sinensis*), lungarn (*Euphoria longana*), citrus varieties, peaches, plums, persimmons (*Diospyros kaki*), Chinese olive (*Canarium album* and *C. pimela*), hwangpee (*Clausena lansium*) and loquat (*Eriobotrya japonica*). The tsao-tze (*Zizyphus sativa*), sometimes called the jujube or Chinese date, is an important fruit in the north. The Chinese gooseberry (*Actinidia chinensis*) grows wild in the mild wintered Yangtze Valley; it has not been cultivated in China. The strawberry tree (*Myrica rubra*), fairly important in S. China, has five or six recognized commercial varieties; its fruit is either eaten fresh or used in confectionery.

1362. MONCIERO, A. 634.62
Étude comparée sommaire des différents types de culture du palmier dattier en Algérie. (Brief comparative study of the different types of date palm culture in Algeria.)
Fruits d'Outre Mer, 1947, 2: 374-82, illus.

An account of 5 types of culture (4 irrigated) and the methods to be followed in planting and caring for a date plantation. There is a short final section on the chief date diseases and pests and their control.

1363. BALLANTYNE, J. A. 634.62
The growing of dates.
Agric. Gaz. N.S.W., 1947, 58: 589-91.

This article sets out the difficulties to be overcome before dates can be grown in New South Wales, and describes the methods by which this crop is produced commercially in other countries.

1364. DU PREEZ, D. 634.653
The avocado in the Western Cape Province.
Fng S. Afr., 1948, 23: 21-7.

An account of the early performance of a variety trial of avocados at Bien Donne, where planting began in 1941. The trees are irrigated every two or three weeks during the summer, and the Fuerte trees have borne well and regularly since 1945. It is essential to protect the young tree against sun scorch in its first year.—Western Province Fruit Research Station, Stellenbosch.

1365. CRANDALL, B. S. 634.653-2.4
Phytophthora cinnamomi root rot of avocados under tropical conditions.
Phytopathology, 1948, 38: 123-9, bibl. 17.

This root rot of avocados has been found in the Tingo Maria region of Peru on soils that are well or poorly drained, light or heavy, and on mature and nursery trees. Healthy trees were growing on the same sites. Trees which develop chlorosis and sudden wilting are infected at the collar with girdling cankers. Slow decline and die-back are caused by infection and death of the smaller rootlets, with the main roots and collar generally free from infection.—Estacion Central de Colonización, Tingo Maria, Peru.

1366. BATTIATO, C. 588.83: 581.4
Su alcuni casi di fasciazione in *Feijoa sellowiana* Berg. e sulle cause che la determinano. (Fasciation in feijoa and its causes.)
Ann. Staz. sper. Frutt. Agrum. Acireale, 1948, 17: 23-9, bibl. 15.

The instances of fasciation discovered show their interdependence on the deviation of the ontogenetic processes as shown by the abnormal disposition of the bud-leaf complex. The author considers that the branches which show deviation in the normal disposition of the leaves are predisposed to fasciation and he draws attention to the subsequent development of the buds on the fasciated branches, which results in repeated fasciation and the development of branches bearing irregularly disposed leaves. He particularly notes the anatomical and histological peculiarity of the fasciated branches as regards the evagination of the tissues lying below the leaf bud insertion. Further studies are proposed for determining whether plants from seed from fasciated branches are particularly prone to the phenomenon.

1367. COSTANTINO, G. 632.76: 588.83
Un insetto parassita della *Feijoa sellowiana*
Berg: il *Labidostomis taxicornis* Fabr. (*Labido-*
stomis taxicornis, parasitic on feijoa.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale,
1941, 16: 1-6, bibl. 17, illus. [received 1948].
Labidostomis taxicornis was noticed in Sicily for the first
time in 1938 on feijoa and its movements were observed.
The adult attacked leaves. No great alarm was occasioned.
1368. HAMILTON, R. G. 634.74
Tree-tomatoes in growing demand.
N.Z. J. Agric., 1947, 75: 279-87.
An illustrated account of the tree tomato, *Cyphomandra*
betacea, and its cultivation (see also H.A., 13: 571). Methods
of packing are described and illustrated.

Other crops.*

1369. I[SLIP], H. T. 633.94
Mastic.
Bull. imp. Inst. Lond., 1947, 45: 133-4.
Mastic, mastiche or mastix is an oleo-resin obtained, by
tapping, from *Pistacia lentiscus*, a small tree occurring in
S. Europe and N. Africa. Tapping is carried out in the
latter part of the summer by making shallow incisions in the
bark of the bole and larger branches. The annual yield is
about 12 lb. of mastic per tree, but after the 4th year of
tapping the yield and quality of the resin decrease, so that
further collection is not remunerative. The characteristics
of mastic are described and reference is made to its grades,
pre-war prices and uses.
1370. DROSDOFF, M., SELL, H. M., AND GILBERT,
S. G. 633.85-2.19: 631.83
Some effects of potassium deficiency on the
nitrogen metabolism and oil synthesis in the
tung tree (*Aleurites fordii*).
Plant Physiol., 1947, 22: 538-47, bibl. 14.

* See also 1274.

TROPICAL CROPS.*

General.

1372. MCGREGOR, N. M., AND DUTTA, S. K. 631.612: 633.61 + 633.72
The utilization of waste land.
Memo. Tocklai Exp. Stat. 20, 1947, pp. 19.
Sugarcane is amongst the crops suggested for the so-called
waste lands adjoining tea estates in Assam. Advice is
given on growing the crop. The varieties CO. 419 and
POJ. 2714 are recommended for planting.
1373. MASEFIELD, G. B. 633.73 + 633.912 + 634.773
The life of perennial crops.
E. Afr. agric. J., 1948, 13: 160-1, bibl. 3.
After demonstrating the ignorance which exists regarding
the expectation of life of many tropical crop plants, the
author briefly discusses the economic life of coffee, plantains
and para rubber, with particular reference to Uganda.
A plea is made for further study of the subject in E. Africa.
1374. DYMOND, G. C. 631.875 + 632.51
An item in conservation [the water hyacinth].
Proc. 21st Ann. Congr. S. Afr. Sug. Tech. Ass.,
1947, 101-3, bibl. 4, illus.
The suggestion is made that the water hyacinth, *Eichhornia*
crassipes, should be used in Natal for trapping fertility
which would otherwise be lost. The weed could be dragged
to river banks and composted there. Figures are given
showing analysis of the plant under different conditions and
an evaluation is made of its NPK in terms of unit values.

* See also 791, 1052, 1053, 1244, 1247, 1248, 1251-1253, 1530-
1540, 1543.

In the leaves of 4-year-old tung trees deficient in potassium,
starch and polysaccharides accumulate early in the season,
and later they tend to disappear to a greater extent than
from trees fertilized with K. The kernels of trees deficient
in K had a lower oil content and a higher content of sucrose
than had kernels from trees fertilized with K, and it is
suggested that K may be concerned with the conversion of
sugar into oil. Nitrogenous fertilization increased the
percentage of kernel and its protein content.—University
Station, Gainesville, Fla.

Noted.

1371. a COSTANTINO, G. 634.3-2.76
Danni accidentalmente causati dall' *Otiorrhyn-*
chus armatus Boh. a due specie del genere
citrus: *Citrus medica* L. (Cedro rugoso, cedro
vozza vozza) e *Citrus limonia* Osb. (Fortuitous
damage done by *O. armatus* to citron and lemon
trees.)
Ann. R. Staz. sper. Frutt. Agrum. Acireale,
1941, 16: 7-10, bibl. 26, illus. [received 1948].
- b EVREINOFF, V. A. 634.462
Le caroubier. (The carob [*Ceratonia siliqua*].)
Fruits Primeurs, 1948, 18: 53-9, bibl. 31,
reprinted from Rev. Bot. appl., 1947.
- c FLORIDA CITRUS COMMISSION. 634.3: 632.95
Spray and dust schedule for 1948 season.
Folder Florida Citrus Commission, 1948, p. 1.
- d VENNING, F. D. 634.3
Variations of accessory vascularization in four
species of citrus and their possible application
as new taxonomic characters.
J. Wash. Acad. Sci., 1947, 37: 210-17, bibl. 9,
illus.

This weed, with its rapid rate of reproduction, may prove
the only practical instrument for recovering some of the vast
quantities of plant nutrients at present lost in drainage
waters.

1375. PENFOUND, E. T. 1632.51
Morphology in relation to control in the water
hyacinth.
Bull. ecol. Soc. Amer., 1947, 28: 56.
This noxious weed is capable of doubling its numbers every
2 weeks by the production of offshoots. Its rhizomes are
the vital targets in controlling it, since they produce the
offshoots and inflorescences. Rhizomes average about
8 in. in length, but only 1.5 in. of the tip was found capable
of reproduction. This and the fact that the tip of the
rhizome rests about 1 in. below the water surface is said to
be of "considerable importance in control, since we need
be concerned only with the level from 1 to 2.5 inches below
the water surface". Other morphological characteristics
of the plant are described. The wet-weight of this weed
averaged approximately 150 tons per acre (=8 tons dry-
weight), a mass impractical to handle by most mechanical
means.

1376. PENFOUND, W. T., AND MINYARD, V. 632.51: 577.17
Relation of light intensity to effect of 2,4-dichloro-
phenoxyacetic acid on water hyacinth and kidney
bean plants.
Bot. Gaz., 1947, 109: 231-4, bibl. 2.
The butyl ester of 2,4-D, applied in kerosene, was more
toxic to plants grown in shade than to others.—Oklahoma.

1377. VAN OVERBEEK, J. 632.954: 577.17
Use of synthetic hormones as weed killers in
tropical agriculture.
Econ. Bot., 1947, 1: 446-59, bibl. 57.

The author reviews recent work on the physiological action of 2,4-D in particular. 2,4-D is particularly valuable for weeding such tropical crops as sugar cane and coffee, provided it is applied when the weeds are young and actively growing. Among resistant plants are *Erythrina* spp. used as shade trees for coffee, *Derris elliptica*, and most grasses. Nut grass, *Cyperus rotundus*, and *Stizolobium pruriens* are among the troublesome weeds killed by 2,4-D. The danger of clean weeding in the tropics is discussed.

1378. BECKLEY, V. A. 632.954
Weed killers [in Kenya].
E. Afr. agric. J., 1948, 13: 170-1.

A note on the successful, experimental use of hormone herbicides in Kenya. A list of 20 local weeds is given, divided into: sensitive, slightly resistant, and resistant.

1379. TAM, R. K. 632.954: 577.17: 634.774
Comparative herbicidal value of 2,4-dichlorophen-
oxyacetic acid and 2,4,5-trichlorophenoxyacetic
acid on some herbaceous weeds, shrubs, and trees
under Hawaiian conditions.
Bot. Gaz., 1947, 109: 194-203, bibl. 11, being
Misc. Pap. Pineapple Res. Inst. Hawaii 45.

Both chemicals were too toxic to be used as weedkillers among growing pineapples. 2,4,5-T was more toxic than 2,4-D to a number of shrubs and trees.

Sweet potato.

1380. ANDERSON, W. S., AND STEINBAUER, C. E. 633.492
Australian Canner, a new sweetpotato variety.
Market Gr. J., 1948, 77: 4: 34, 44.

The sweet potato variety Australian Canner originated in New South Wales from a seed produced at the Hawaii Experiment Station. The tubers are small to medium and retain their shape when canned whole. The flesh has an orange colour and is of good quality.—Horticultural Dept., State College, Mississippi.

1381. COOK, H. T., AND HARTER, L. L. 633.492: 631.532
Chemicals effective for sweet potato "seed"
treatment.
Bull. Va Truck Exp. Stat. 109, 1942, pp. 7, bibl.
10 [received 1948].

Instead of using mercuric chloride to control the black rot fungus, *Ceratostomella fimbriata*, of sweet potatoes, the grower may protect seed pieces by placing them in a 2.5% solution of borax for 10 minutes immediately before planting.

1382. BROWN, O. A. 633.492-1.51
Machines for sweetpotatoes.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp.
824-6.

The operation of the following machines, amongst others, is briefly described: sweeps, a simple transplanter, and a vine-harvester.

1383. LEEFVRE, P. C. 633.492-2.78
Acraea acerata Hew. parasite de la patate
douce. (*Acraea acerata*, a parasite of the sweet
potato.)
Bull. agric. Congo belge, 1948, 39: 49-76, bibl. 11.

The caterpillars of this pest can be controlled by dusting with pyrethrum. Its life cycle is described.

Sugar cane.*

1384. ARCENEUX, G. 633.61(73)
Sugarcane culture [in U.S.A.].
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp.
855-7, bibl. 3.

Not only have new and better sugar-cane varieties been introduced, but improved farming methods have also been developed in recent years, mainly in time of planting, mechanical cultivation and weed control. During the past 20 years the average planting date has been advanced considerably, thus almost all planting in Louisiana is now done before the old crop is harvested. Mechanization has been greatly stimulated by labour shortages. Mule-drawn ploughs and cultivators have been largely replaced by tractor-drawn implements, and hand hoeing, etc., by improved shaving devices, mechanical hoes and flame cultivators. Some of these new implements are briefly described. In recent tests 2,4-D proved to be better than flaming for the control of susceptible weeds. A new sugar-cane variety, CP. 34/120, which combines good shading with other desirable characters, is being used to control weeds on ditch banks—a problem to which considerable attention has been given.

1385. SARTORIS, G. B. 633.61(73)
New kinds of sugarcane [in U.S.A.].
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp.
353-6, bibl. 2.

A short introduction on the development of sugar-cane breeding is followed by notes on the origin and attributes of some new C.P. (Canal Point, Fla) varieties, six of which have been released for commercial planting since 1941. Outstanding amongst these is C.P. 34/120, which is successful throughout the Louisiana cane belt. "Progress in improving sugarcane has been in the direction of increasing yields and developing varieties that can be harvested more easily and economically by machines." A genealogical table shows the descent of the C.P. varieties now grown commercially in the U.S.A.

1386. DU TOIT, J. L. 633.61(684)
Trends in cane and sugar yields in Natal.
Proc. 21st Ann. Congr. S. Afr. Sug. Tech. Ass.,
1947, pp. 116-28, bibl. 3.

The yield of cane per acre has increased by about 50% in Natal since the introduction of new varieties which have now almost entirely replaced Uba. This increase is not entirely the result of new varieties. An analysis of cane yields indicates that the productivity of the soil has increased. Contrary to expectations, the average sucrose content of cane has not increased. Factory efficiencies have improved from about 73% overall recovery in 1925 to over 83% to-day. About 3½ tons of 96° pol. sugar are now recovered per acre from the 2-year cane crop.—Exp. Stat., S. Afr. Sugar Ass., Mt. Edgecombe.

1387. EVANS, H., AND WIEHE, P. O. 633.61(698.2)
Experiments on the treatment of cane setts at
planting under Mauritius conditions.
Bull. Sug. Res. Stat., Mauritius 19, 1947, pp. 36,
bibl. 14, 50 cents.

The outstanding result from these experiments was the success of Aretan, which proved superior to all other organic mercury compounds tested in the treatment of cane setts. Not only was it effective in protecting cuttings from pineapple disease (*Ceratostomella paradoxa*), but it also promoted shoot growth. Increases of the order of 4 tons of cane per acre were reported through its use.

1388. ENGARD, C. J., AND NAKATA, A. 633.61: 577.17
Plant hormone investigations in sugarcane.
Bienn. Rep. Hawaii agric. Exp. Stat. 1944-46,
1947, pp. 112-16, bibl. 7.

* See also 830, 1377, 1532, 1536.

Hormone investigations have been undertaken in connexion with an attempt to correlate ontogenetic development of sugar-cane with physiological changes within its axis tissue. Hormone extraction methods and the conditions under which the *Avena* assay was conducted are described at some length. It is concluded that "at least two substances are indicated in sugar-cane tissue: (1) a growth-promoting substance of the acid type and (2) an inhibitor". The investigation is being continued.

1389. MUKERJI, B. K., AND KRISHAN, R. 633.61
"Rayungan" method for speedy multiplication
of seed material in sugarcane.
Curr. Science, 1948, 17: 55-6.

A note on the successful use of this method in which latent buds are induced to sprout on the standing cane by cutting off its top 4 to 6 weeks before planting-time and stripping off its leaves. When the buds have produced shoots ("rayungans") 4 to 6 in. long, the cane is cut into numerous single-node cuttings which are planted in manured and irrigated trenches.—Main Sugarcane Research Stat., Shahjahanpur, U.P.

1390. DODDS, H. H. 633.61-1.5
Some recent improvements in agricultural
machinery used in the sugar industries of Louisiana
and Queensland.
Proc. 21st Ann. Congr. S. Afr. Sug. Tech. Ass.
1947, pp. 109-15, bibl. 6.

The need for labour-saving agricultural methods and appliances in the S. African sugar industry is pointed out, and developments of new implements abroad are mentioned. Cane harvesters, loaders and other agricultural machines used in Louisiana are described and discussed. E. R. Behre's report to the Queensland Department of Agriculture on a visit to Louisiana and elsewhere to study mechanical harvesting and loading of cane is discussed. A description is given of cane harvesters and loaders designed and used in Queensland and the conclusion is reached that they are probably more adaptable to S. African conditions than those evolved in Louisiana. A note is included on preliminary inquiries into labour-saving devices on S. African sugar-cane plantations.

1391. CLEMENTS, H. F., AND OTHERS. 633.61-1.83
Potassium and sugarcane.
Bienn. Rep. Hawaii agric. Exp. Stat. 1944-46,
1947, pp. 108-11.

A condensed account is given of experiments designed to discover an index tissue from which to determine the level at which potassium must be maintained in order to obtain maximum crop returns. It was found from a determination of "t" values for linear regression coefficients between K levels of four possible index tissues and each of several plants of a sugar-cane variety, that of these 4 tissues the young leaf-sheaths were the best for the purpose of expressing the K index. The K index is defined as the potassium content of the young leaf-sheaths expressed as a percentage of the sugar-free dry weight. In a study of sugar-cane from numerous plantations it was found that the K index varied from 0.17 to 5.10. At 0.17 the plants were stunted and sickly, at 5.00 they were lush but generally of poor quality. From field experiments designed to determine the minimum potassium level for normal cane growth it was concluded that: (1) the K index is sensitive to manurial treatment, (2) the minimum K index needed for adequate growth is between 1.84 and 2.92, and (3) that the quality of cane tends to drop at the high levels. In factorial field trials to determine the normal potassium level in plantations known to be low in potassium and phosphorus, the general conclusion drawn was that the minimum level of the K index was 2.13 or above and that a P index of 0.083 was adequate for the heaviest growth observed in the experiment. As a result of experiments of the type described the minimum

level for the K index has been set at 2.25 and for the P index 0.080.

1392. ESPINO, R. B. 633.61-2.5
Eleven years' study on "Buña ñig Tubo" [*Aeginetia indica* L.].
Philipp. Agric., 1947, 31: 151-3.

As a result of experiments, the following measures are suggested for controlling this phanerogamic root parasite in sugar-cane plantations: the burning of trash; the removal of stubble in fields not to be ratooned; the digging up, with a special trowel, of infected portions of sugar-cane roots as soon as bunga flowers appear; the eradication of infected secondary hosts, e.g. *Imperata exaltata*.

1393. ANON. 633.61-2.75
Notes on frog hopper control.
Proc. agric. Soc. Trinidad, 1946, 46: 235-42.

Economic control of the sugar-cane frog hopper *Tomaspis* sp. can be accomplished by large scale dusting with DDT.

Tea.

1394. TKATCHENKO, B. 633.72(47)
Le thé en U.R.S.S. (Tea in the U.S.S.R.)
Agron. trop., 1947, 2: 614-46, bibl. 97, illus.

In the introduction to this interesting article the author, who is in the French Colonial Agricultural Service, opens with a short history of tea in Russia from the tentative introduction of a few cases in 1618 to modern times. Before the first World War Russia bought 85,000 metric tons of tea annually, a figure which had fallen to an average of about 15,000 metric tons per year just before the second World War. About 20 years ago Russia launched a home production campaign in which tea was planted in the Soviet subtropics as far north as 43° 40' N. latitude. The area planted by 1945 had reached over 120,000 acres and the gross production about 20,000 metric tons. The results achieved are of interest to old-established tea-producing countries and to the international tea trade. The author asks, and attempts to answer, these questions: to what extent will Russian production satisfy the real needs of the U.S.S.R., and can the world tea trade count on the growth of a Russian market in the near future? The article sets out to show the conditions in which the Soviet tea industry has developed and indicates the progress made in field technique and in the chemistry and technology of tea manufacture. These subjects are dealt with under the following heads: the situation of the tea districts and the areas grown, climate, soils, planting material, methods of planting, pruning, harvesting, yields, manures, biochemical research on tea manufacture, the technology of black and green tea, the manufacture of "crystallized" tea and tea products, the quality of Soviet tea, U.S.S.R. production and national needs. There are 10 photographs of tea gardens, numerous text figures and tables and an impressive bibliography.

1395. TUBBS, F. R. 633.72
The competition factor.
Tea Quart., 1947, 19: 101-5.

Experiments on the replanting and interplanting of tea indicate that root competition, which is the most important factor, is considerably reduced for some months after pruning the old tea. Manures should be applied to supplies when the root activity of the established plants has been reduced in this way.

1396. BOND, T. E. T. 633.72-2.8
The "phloem necrosis" virus disease of tea in Ceylon. III. Further characterization of necrosis in the leaf.
Ann. appl. Biol., 1947, 34: 517-26, bibl. 13.

Phloem necrosis virus disease of tea (*H.A.*, 14: 876; 15: 828), fully described as it affects the leaf, causes the breakdown and discoloration of the cells with their eventual

death and obliteration, cell enlargement, and the production of new thin-walled cells by hyperplasia. The condition is termed "true necrosis" to distinguish it from the non-pathogenic "false necrosis" of unknown cause, which may have the same histological effects except for the absence of hyperplasia.—Sheffield Univ. from Ceylon.

1397. TUBBS, F. R. 633.72-2.4
Spraying and dusting in the control of blister blight in tea.

Tea Quart., 1947, 19: 78-92.

Copper fungicides were tested extensively for the control of blister blight in Ceylon. During rapid growth protection can be given by spraying Perenox at the rate of 2 oz. per 10 gal. water at intervals of 7 to 10 days from budbreak to tipping. Dusts containing copper also gave good control, but, although the water problem is obviated, they are expensive and are not easily kept dry in the field. Field problems are discussed, and it is concluded that the terrain makes it essential to use knapsack sprayers, despite the cost of labour. In the nursery a similar spray of Perenox or Sandoz should be applied weekly; an absorbent mulch should be replaced periodically to reduce the addition of Cu to the soil.

1398. CAMERON, D. S. 633.72-2.4
Blister blight in relation to planting and supplying tea.

Tea Quart., 1947, 19: 92-5.

In parts of Ceylon planting and supplying vacancies in old tea are made difficult by blister blight. A scheme is outlined for the selection, vegetative propagation, and mechanical transplanting of immune bushes on a large scale. The establishment of isolated seed gardens of immune bushes is mentioned, and this is discussed in an editorial note.

1399. EDEN, T. 633.72-2.4
The effects of hard plucking (with special reference to blister blight).

Tea Quart., 1947, 19: 105-9.

Hard plucking is recommended for the control of blister blight; since plucking to the fish-leaf when only two additional leaves and a bud have been developed greatly reduces the number of active blisters. The results for the first four years of an experiment comparing fish-leaf plucking with normal single-leaf plucking are analysed. Yield.—Fish-tail plucking led to a progressive increase in yield during the first two years; during the last 18 months the yield was 46% above normal. Flush size.—Fish-tail plucking increased the number of plucked shoots by 80% and decreased their mean dry weight by 30%. Starch reserves.—Starch reserves in the roots appeared to be unaffected. At the end of the cycle much less wood was pruned from the fish-tail plots, but these recovered rapidly when restored to single-leaf plucking. No permanent harm is done by plucking to the fish-leaf for two or three months annually.

1400. MAYNE, W. W. 633.72-2.4
Blister blight in the High Range [of South India].

Plant. Chron., 1948, 43: 12-16.

A review of the behaviour of the disease in the High Range, particularly in relation to showery periods. Conditions during the past season appear to have been particularly favourable for the fungus. Now that the main danger periods have been defined it should be possible to devise experimental modifications in management methods with a view to minimizing losses from the disease.

Coffee.*

1401. CRAMER, P. J. S. 633.73
Les caféiers hybrides du groupe "congusta".
(The Congusta coffee hybrids.)
Bull. agric. Congo belge, 1948, 39: 29-48,
bibl. 35.

* See also 1526.

The term Congusta is used to describe hybrids between *Coffea congensis* and various species of the robusta group. The Bangelan clones vary in fruitfulness, and some have been used extensively for grafting in old robusta plantations in the Netherlands East Indies. Their use in the Congo is discussed.

1402. S'JACOB, J. C. 633.73: 581.11
Over de verdamping van jonge robusta-planten.
(The transpiration of young robusta coffee.)
Arch. Koffiecult. Ned.-Ind., 1938, 12: 109-25,
bibl. 14 [received 1948].

The transpiration of shaded robusta coffee is low compared to that of the shade trees used, such as *Leucaena glauca*.

1403. PATTABHIRAMAN, T. V., AND GOPALKRISHNAN, K. S. 633.73-1.535
Importance of reserve food materials in successful establishment of shoot cuttings in *Coffea robusta*.
Curr. Sci., 1947, 16: 385, bibl. 4.

Two experiments are described in which single node "leafy cuttings" from ringed and unringed suckers of *Coffea robusta* were compared. Of 50 cuttings from ringed suckers (ring-barked at every node) 27 rooted in about 3 months, whereas of the 50 cuttings from unringed suckers only 3 rooted in the same period. It is claimed that the experiments demonstrate the importance of reserve food materials in robusta coffee cuttings.—U.P.A.S.I. Coffee Exp. Stat., Sidapur, S. India.

1404. ROELOFSEN, P. A. 633.73-1.535
Aanvullende proeven over het stekken van koffie. (Further experiments with coffee cuttings.) [English summary ½ p.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 105-18,
bibl. 2 [received 1948].

Various applications of indolebutyric acid or yeast extract to decapitated robusta cuttings did not improve rooting. The robusta clones tested differed widely in their rooting capacity.

1405. ROELOFSEN, P. A., AND COOLHAAS, C. 633.73-1.535: 577.17
Over het stekken van *koffie, stimuleering van de wortelvorming en groeistofbehandeling bij het enten. (The stimulation of rooting in coffee cuttings and the use of growth substances in grafting coffee.)
Arch. Koffiecult. Ned.-Ind., 1939, 13: 87-150,
bibl. 32 [received 1948].

Apical cuttings from young suckers of *Coffea robusta* can be rooted in sand in propagators. Light is reduced to 30% and the frames are cooled by moist cheese-cloth covers. The leaf area is reduced to 50 sq. cm. for cuttings 20 to 30 cm. long, and 80 to 90% of these root within three months. 50% of grafted cuttings formed roots. The treatment of grafts with indoleacetic acid in lanoline suppressed bud growth.

1406. LAMBERS, M. H. R. 633.73-1.541
Eenige waarnemingen over de ontwikkeling van den takten bij gebruik van verschillend entrijs. (Some observations on the development of the branch graft from various types of scion.)
Arch. Koffiecult. Ned.-Ind., 1939, 13: 70-84,
bibl. 3 [received 1948].

The writer has established the following correlations in coffee grafted with different scion material:—stock circumference and length of the three longest branches of the scion, length of these branches and their angle to the horizontal, yield and volume of aerial parts, amount of leaf and horizontal development of crown, and diameter of crown and diameter and dry weight of root system. Certain clones can be recommended for top working inferior coffee bushes.—Malang, Java.

1407. LELIVELD, J. A. 633.73: 581.145.2
Vruchtzetting bij koffie.* (Fruit setting in coffee.) [English summary 1½ pp.]
Arch. Koffiecult. Ned.-Ind., 1938, 12: 127-64, bibl. 22 [received 1948].
Light rainfall stimulates the opening of mature flower buds; fertilization occurs 30 to 50 hours later, when the embryo sac matures. The integument swells, but embryo and endosperm do not develop until the next rains. If the embryo sac fails to mature, the flower is shed soon after opening. Some months later the unfertilized berries fall. Apparently normal fruits are shed in April; for physiological reasons an abscission layer is formed in the stalk, which elongates further when the fruit ripens normally. Round bean or peaberry is due to the failure of one ovule. Woolly or empty bean, common in hybrids between diploid and tetraploid species, is due to abnormal endosperm development caused by an unbalanced chromosome complement.—Malang, Java.
1408. SCHWEIZER, J. 633.73: 581.144.4: 581.192
Physiologische studies bij koffie. I. De chemische samenstelling van het blad in verband met seizoen en vruchtdracht. (Physiological studies on coffee. I. The chemical composition of the leaf as affected by season and yield.) [English summary 1½ pp.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 165-98, bibl. 8 [received 1948].
Overbearing depletes carbohydrate reserves in the coffee plant and causes die-back. This happens with arabica and robusta. The composition of samples taken for analysis was influenced by the rainfall during the weeks before sampling.
1409. s'JACOB, J. C. 633.73-1.84
Voedingsphysiologische onderzoeken bij *Coffea arabica*. II.† De stikstofvoeding. (Physiological experiments on the nutrition of *C. arabica*. II. Nitrogen nutrition.)
Arch. Koffiecult. Ned.-Ind., 1939, 13: 27-46, bibl. 29 [received 1948].
In water culture at pH 4.6 dry weight of *Coffea arabica* increased rapidly as NO_3 nitrogen was increased to 23 mg. N per litre; above 92 mg./l. the dry weight decreased. When NH_4 was used as the source of nitrogen, growth was restricted, and the greatest dry weight was produced with a concentration of 11.5 mg. N per litre. The ammonium nitrogen trial was made during the west monsoon, and it was frequently necessary to protect the plants, thereby decreasing their assimilation. Iron toxicity was partly responsible for the poor growth of the NH_4 cultures.—Besoekish Proefstation.
1410. VAN DER VEEN, R. 633.73-1.8
Voedingsphysiologische onderzoeken bij koffie. III.† (Physiological experiments on the nutrition of coffee. III.) [English summary 2 pp.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 199-224, bibl. 9 [received 1948].
Difficulties in the water culture of robusta coffee were overcome by giving the seedlings adequate light; and the acidity range was extended to pH 7 by growing the plants in rotation in three separate solutions supplying Fe, Ca, and P. Robusta seedlings preferred a pH above 4.0. Boron deficiency in robusta resembled that shown by arabica. The symptoms of calcium deficiency were apparently due to the toxic effect of other elements. Potassium deficiency deforms the leaves of robusta. Magnesium deficiency symptoms are less pronounced in robusta than arabica.
- * An abridged translation is available at this Bureau.
† For part I see *ibid.*, 1938, 12: 1-48; *H.A.*, 8: 1210.
‡ Continuation of a series by s'Jacob; see previous abstract.
- Nitrogen is best supplied as NO_3 ; as NH_4 it is readily assimilated and is toxic to the leaves.
1411. ROELOFSEN, P. A., AND COOLHAAS, C. 633.73-1.55: 581.192
Waarnemingen over de periodiciteit in de chemische samenstelling van de takken van den producerenden koffieboom en over de samenstelling van den geproduceerden oogst. (Fluctuations in the chemical composition of fruiting branches of coffee, and the composition of the crop produced.) [English summary 1 p.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 133-58, bibl. 6 [received 1948].
Leaves, branches and cherries of bearing and unfruitful robusta coffee bushes were analysed at intervals throughout the year, N, P, K, C, Mg, Mn, Ca and Fe being determined. Analyses indicated that potassium may be inadequate during the ripening of the crop. It was impossible to detect any shortage of carbohydrates, as the C content of the different parts was remarkably constant. For every quintal of coffee berry prepared, 5 kg. K_2O , 3.5 kg. N and 0.6 kg. P_2O_5 are removed from the plantation. Artificial manures should be applied at intervals while the fruit is ripening.
1412. SNOEP, W. 633.73-1.4-1.8
Boniteitsfactoren bij koffiegroonden en de invloed daarop van bodembehandeling. (The effect of cultural practices on the properties of coffee soils.) [English summary 2 pp.]
Arch. Koffiecult. Ned.-Ind., 1941, 15: 143-85, bibl. 2 [received 1948].
Soil structure and nitrogen status account for much of the variation in the value of soils for coffee. Cover crops, whether leguminous or not, have little effect on N on account of the competition from their roots, or on soil structure; but they can benefit the coffee if cut regularly and left as a surface mulch to release nitrogen.
1413. VAN DER VEEN, R. 631.847: 633.73
Stikstofbemesting door leguminosën. (Nitrogen manuring by leguminous plants.) [English summary 14 l.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 119-32, bibl. 10, illus. [received 1948].
Experiments are described showing that roots of *Leucaena glauca* can fix and excrete enough nitrogen to increase the N content of leaves of interplanted coffee. Coffee interplanted with *Desmodium ovalifolium* or *Indigofera endecaphylla* suffered from root competition. Although these plants fixed more N than the *Leucaena*, it was not available to the coffee roots.
1414. PERKINS, J. F. 633.73-1.543.1
A note on the effect of *Grevillea* shade on the early flowering of coffee.
Mon. Bull. Coffee Bd Kenya, 1947, 12: 152-4.
The author gives the results of a rapid survey of flowering intensity made in a plantation of arabica coffee, interplanted with shelter-belts of *Grevillea robusta* 35-40 ft. high, growing at 6,800 ft. a.s.l. on Mount Elgon, Kenya. The following tentative conclusions are drawn amongst others: Coffee shaded by *Grevillea* shows a considerably heavier intensity of early flowering than unshaded coffee. The proportion of flowering trees is far greater, and the normal weight of flower carried per tree is considerably heavier. The effect is most pronounced in the immediate vicinity of the shade trees, but it persists outwards to a gradually decreasing extent for some 30-35 ft. in both directions.
1415. PERKINS, J. F. 633.73: 581.145.1
The early flowering of [arabica] coffee.
Mon. Bull. Coffee Bd Kenya, 1948, 13: 9.
An elaboration of an earlier article (see No. 1414 above) on the effect of *Grevillea* shade on earliness of flowering in

arabica coffee. The following advantages are claimed for early flowering: the crop ripens more quickly and can all be picked as ripe cherry; factory work can be carried out more efficiently, the crops coming on the market at the most favourable time; trees retain their vigour, irrespective of the weight of crop borne, and are likely to produce an economic crop the following year.

1416. RAYNER, R. W., AND JONES, P. A. 633.73-2.952
Tonic copper spraying.
Mon. Bull. Coffee Bd Kenya, 1948, 13: 20-1, bibl. 2.

A brief review of 4 trials on tonic sprays for arabica coffee in the Kenya highlands. Some conclusions are drawn and recommendations made. For the present a 2% concentration of one of the following, applied at the rate of four-fifths of a pint per tree, is recommended: carbide-bordeaux mixture, burgundy mixture, cuprous oxide. Assuming that trees are spaced 9×9 ft., the approximate cost of spray materials would be between 6-65 and 8-60 shillings an acre. Tonic spraying should normally begin "when an average of 2 pairs of leaves per bunch have opened since the beginning of the year".—Coffee Services, Dept. of Agric., Kenya.

1417. RAYNER, R. W. 633.73-2.4
Latent infection in *Coffea arabica* L.
Nature, 1948, 161: 245-6, bibl. 3.

During investigations of a disease of green berries of arabica coffee, caused by *Colletotrichum coffeanum*, this fungus was almost invariably isolated from healthy leaf and stem tissues. *Phoma* sp. and *Phomopsis* sp. were also frequently isolated. The presence of these fungi on healthy tissues explains why physiological diseases of coffee have been attributed to fungal attack, as the fungi fructify on tissues that have died from other causes.—Scott Agricultural Laboratories, Nairobi.

1418. MULLER, H. R. A. 633.73-2.4
Topsterfte van koffie. (*Rhizoctonia* top-disease and die-back of robusta coffee.)
Arch. Koffiecult. Ned.-Ind., 1936, 10: 279-349, bibl. 13 [received 1948].

The spread of die-back caused by *Rhizoctonia* sp. can be restricted by pruning and burning all diseased branches. The fungus is only prevalent at elevations above 300 m.; it is very susceptible to heat.

1419. DE FLUITER, H. J. 633.73-2.4
Voorloopige mededeeling omtrent een blad- en twijginstervingsziekte bij *Coffea arabica*. (Preliminary notes on a leaf spot and twig die-back disease of arabica coffee.) [English summary 1 p.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 225-46, bibl. 6 [received 1948].

This disease was prevalent in East Java during the rains of 1938 and 1939 in heavily shaded arabica plantations above 4,000 ft. *Ascochyta coffeae* and *Phyllosticta coffeicola* were frequently isolated from leaf spots and *Phoma coffeicola* from drying twigs. In the nursery the disease was controlled by bordeaux mixture, in the plantation by pruning and thinning the shade trees.

1420. CARAYON, J. 633.73-2.754
Action des insecticides de synthèse sur les hémiptères parasites de caféier au Cameroun. (The effect of synthetic insecticides on hemipterous parasites of coffee in the Cameroons.)
C.R. Acad. Agric. Fr., 1947, 33: 573-6.

Coffee plants in the Cameroons are severely attacked by three hemipterous insects, viz. *Antestia* sp., *Volummus obscurus* Popp., and *Leydorcoris uniformis* Schum. (Miridae). The results of a trial against *Antestia* are tabulated and show the relative efficacy of DDT, HCH, and SPC [see abstract 977]. On the whole HCH appeared to be more effective than DDT.

1421. STEYAERT, R. L. 633.73-2.78
Quelques données sur la biologie de la pyrale du caféier *Dichocrocis* (*Conogethes*) *crocodora* Meyr. (Notes on the biology of the coffee moth *Dichocrocis crocodora*.)
Parasitica, 1947, 3: 129-30.

The pupation of this moth takes place not on the tree but at soil level under the fallen leaves, which should be removed as a control measure. Arsenate of lime or lead can be used against the early larval stages.

Cacao.

1422. VOELCKER, O. J. 633.74(667)
The West African Cacao Research Institute.
Nature, 1948, 161: 117-19, bibl. 2.

An account of the formation and organization of the West African Cacao Research Institute. The progress of research at the Institute is indicated.

1423. WRIGHT, J. 633.74(729.2)
The resuscitation of the cocoa industry in Jamaica.
Ext. Circ. Jamaica Dep. Agric., 7, 1947, pp. 8.

A report of an address delivered in May, 1947. In it the speaker examines the various aspects of the problem and concludes that the prospects for the industry in Jamaica are bright since there appear to be few difficulties in the way of expansion.

Rubber.

1424. MUZIK, T. J. 633.912
Regeneration in *Hevea* seedlings.
Abstr. in Amer. J. Bot., 1947, 34: 587.

Three-fold vegetative multiplication is described. At 3 weeks old the stem is removed from the seedling and rooted in sand. When the shoots from the cotyledon axils have grown to a height of 6 to 9 in., the tap root is split in half, giving two more plants, there being, then, three plants in all.—Firestone Plantations, Liberia.

1425. DE JONG, W. H. 633.912
Een uitdunningsproef bij hevea in het ressort van het proefstation te Malang. (Thinning *Hevea* in Java.)
Arch. Rubbercult. Ned.-Ind., 1941, 25: 511-37 [received 1948].

An earlier report on this thinning experiment appears *ibid.*, 1938, 22: 13-21; *H.A.*, 9: 270. The removal of between 121 and 157 trees per ha. from an original stand of 519-538 per ha. resulted in a loss of yield of 5% to 8% in the first 6 to 18 months after thinning, after which there was no further drop. No reduction followed the removal of 71 trees per ha. at 8 years. In the 13th year 334 trees per ha. gave the highest production. Thinning was successful in fields 8 years old, and the gaps between the crowns closed within 4 years. In the very dry season of 1940 trees widely spaced produced more than densely planted trees.

1426. FULLER, H. J. 633.912: 581.1
Some physiological observations on *Hevea brasiliensis*.
Abstr. in Amer. J. Bot., 1947, 34: 599.

Various growth substances failed to induce rooting of cuttings, although root primordia were formed. Latex yield.—The diurnal fluctuation shows a peak between 2 a.m. and 6 a.m., and a trough in the afternoon. Yield generally decreases when flowering begins. Two opposite quarter tapping panels give consistently greater yields than does a single half-spiral panel. In double half-spiral tapping the lower panel generally gives a greater yield than does the upper, and the girdling of a large branch does not diminish latex flow from the panel below it, facts which

suggest that latex moves upwards. Latex flow is greatly affected by changes in soil moisture. The full insolation of shaded trees rapidly increases latex flow and dry rubber content.—British Guiana.

1427. SOILS DIVISION, RUBBER RESEARCH INSTITUTE. 633.912-1.8

Methods of application of fertilizers.

Circ. Rubb. Res. Inst. Malaya 27, 1947, pp. 6.

Malayan soils immobilize phosphates, particularly when these are broadcast in powder form. Experiments with other crops elsewhere indicate that phosphatic fertilizers should be applied in small holes, several to each rubber plant; these holes form pockets in which the fixation capacity of the soil is saturated, so that the fertilizers are available to plant roots. Potash may also be fixed, and it should therefore be applied in the same way. NPK mixtures may be similarly applied, although soluble nitrogenous fertilizers may be broadcast just as effectively. An alternative method is the "placement" and burying of the fertilizer at the bottom of a furrow 6 in. deep between rows.

1428. SMITH, H. F. 633.912-1.55
A sampling survey of tapping on small holdings (1939-40).
J. Rubb. Res. Inst. Malaya, 1948, 12: 79-125, being *J.R.R.I. Commun.* 265.

Much of the information included in this communication is now out of date. The principal object in analysing and publishing the surviving data from the survey is to pave the way for the efficient design of any future survey that may be undertaken.

1429. VAN HELL, W. F. 633.912-2.4
Resultaten van de bestrijding van de witte wortelschimmel in een herplanting. (The control of *Fomes lignosus* root disease on replanted rubber.)
Arch. Rubbercult. Ned.-Ind., 1941, 25: 587-619, bibl. 7, being *Meded. algem. Proefstat. AVROS Rubberser.* 123 [received 1948].

Two treatments were compared for controlling white root rot in young rubber, beginning 18 months after replanting. In the following three years 32% of the control trees died; where infected roots were treated with 2% CuSO_4 or 2% bordeaux 21.8% died; when, in addition to the fungicidal treatment, old stumps were removed and the ground was cultivated to a depth of 2 ft., only 4.2% of the trees were lost.

1430. MARTIN, W. J. 633.913-2.4
The occurrence of South American leaf blight of Hevea rubber trees in Mexico.
Phytopathology, 1948, 38: 157-8.

South American leaf blight (*Dothideella ulei*) was found in 1946 in a seedling nursery of Hevea in southern Mexico; on making a survey new infections were found in most of the one-year-old seedling nurseries near Teapa, and other infections occurred on older trees.

Coconut.

1431. SALGADO, M. L. M. 634.61
The possibilities of ley farming and alternate husbandry on coconut estates.
Times, Ceylon, 1947, 19-24 July, 1 p.

The assimilation by the coconut palm of the essential element, potash, is upset by excess nitrogen. The author proposes to avoid this by establishing a grass-legume "ley", which will be disk-harrowed occasionally and ploughed in every two years when manures are applied. Regeneration is sufficiently rapid to allow of rotational grazing, and the rate of N mobilization is reduced so that no K deficiency is shown by the coconuts.—Coconut Research Scheme, Ceylon.

1432. CHILD, R. 634.61
Coconut exports lowest on record since 1918.
Times, Ceylon, 1947, 4 March, 3 pp.

The marked fall in exports of coconut products from Ceylon in 1946 was due largely to drought in 1945. This is the fourth occasion of drought being followed within two years by a marked decline in the yield of coconuts. In addition to wide seasonal fluctuations, a gradual decline in exports has occurred, a result of decreased production accompanied by an increase in local consumption.—Coconut Research Scheme, Ceylon.

1433. SALGADO, M. L. M. 634.61-1.8
Recent studies on the manuring of coconuts in Ceylon.
Trop. Agriculturist, 1946, 102: 149-54, 206-18 [received 1948].

The first part of this article discusses the factors governing coconut cultivation, the application of statistical methods to field experiments, and problems of coconut manuring. The results of field and laboratory experiments carried out during the previous 10 years are then discussed, more particularly as they concern applications of NPK to good and bad coconut soils, the influence of manuring on copra yields, the development of female flowers and the percentage set of nuts.—Coconut Research Scheme, Ceylon.

Fruit species.

1434. CHOWDHURY, S. 634.415-2.4
A *Glomerella* rot of nuna [*Annona reticulata*].
Curr. Sci., 1947, 16: 384, bibl. 1.

A fungus fruit-rot of *Annona reticulata* [Bullock's Heart], first observed in 1944, is described and the fungus identified as *Glomerella cingulata*. The rot can be prevented by spraying with bordeaux mixture.—Agric. Lab., Jorhat, Assam.

1435. GONZALEZ, L. G., AND LUARDO, B. R. 634.571
Introduced rambutan trees [*Nephelium lappaceum*] in the college of agriculture and their propagation by inarching.
Philipp. Agric., 1947, 31: 133-40, bibl. 7, illus.

Budded rambutans from Java have proved well adapted to Philippine conditions. In quality, the better varieties compare well with litchi and possess many characteristics in common with it, including nature of flesh and taste. The rambutan can easily be inarched with either rambutan or bulala seedlings. The seed germinates in about 9 to 19 days. The plant can be inarched in about 5 months, and the inarched plants are ready for cutting in 40 to 68 days. The percentage of success in inarching increases considerably from the fifth to the ninth month. Three-year-old seedlings are difficult to inarch. Reasonably consistent differences were found among the rambutan, the bulala, and the kapulasan which would facilitate their distinction. [From authors' summary.]

1436. DODDS, K. S., AND SIMMONDS, N. W. 634.771
Genetical and cytological studies of *Musa*. IX. The origin of an edible diploid and the significance of interspecific hybridization in the banana complex.
J. Genet., 1948, 48: 285-93, bibl. 10.
CHEESMAN, E. E.
On the nomenclature of edible bananas.
ibid., 1948, 48: 293-6, bibl. 3.

Four diploid bananas are described: a clone of *Musa balbisiana*, a parthenocarpic form of *M. acuminata*, a parthenocarpic F_1 hybrid between them, and an edible diploid very similar to the hybrid; it is suggested that the edible diploid arose from a similar hybridization. The evolution of the edible triploid bananas is discussed. For the three groups of cultivated bananas Cheesman suggests

the use of the following names:—*M. paradisiaca* L. for the group thought to have been derived from *M. acuminata* Colla; *M. balbisiana* (sensu lato) for those derived from *M. balbisiana* Colla; and *M. sapientum* L. (sensu lato) for those thought to be of hybrid origin.—Imperial College of Tropical Agriculture, Trinidad.

1437. RIBEIRO, M. G. 634.771(649)

Análise de bananas da ilha da Madeira. (An analysis of the bananas of the island of Madeira.) *Bol. Junta nac. Frutas*, Lisbon, 1947, 7: 42-50, bibl. 7.

The Madeira banana, *Musa nana* Lour was analysed for its content of water, carbohydrates and proteins, and comparisons were drawn between its composition and that of bananas from other sources. With regard to its protein and carbohydrate contents it compares favourably with other fruits; in the data tabulated it came highest in protein content and was third after quince and medlar in its carbohydrate content.

1438. SMITH, W. A. 634.771-2.73

Banana rust thrips control.

Qd agric. J., 1947, 65: 315-18.

Thrips damage on banana fruit in southern Queensland may be controlled by applying 2% DDT dust as soon as the bunch is formed and thereafter at fortnightly intervals. Most damage is done early in the life of the bunch, and if the thrips population is low, two to four applications may suffice.

1439. KERNS, K. R., AND COLLINS, J. L. 634.774

Chimeras in the pineapple—colchicine-induced tetraploids and diploid-tetraploids in the Cayenne variety.

J. Hered., 1947, 38: 323-30, bibl. 7, being *Tech. Pap. Pineapple Res. Inst. Hawaii* 174.

Colchicine solution was applied to the apical meristem either by a hypodermic needle or by pouring it into the crown after pulling out some of the central leaves. Germinating hybrid seeds were also treated. The auto-tetraploid plants, which have smaller fruits, maintain the self-incompatibility of the diploids.

1440. DE VASCONCELOS FRANCO, J. G. 634.774

O ananás de S. Miguel e os seus mercados. (The San Miguel pineapple and its markets.) [Summary in English and French.] *Bol. Junta nac. Frutas*, Lisbon, 1947, 7: 148-59.

The pineapple culture of San Miguel (Azores) is described and data are given on the quantities exported to London and Hamburg in 1938 and 1939.

1441. SIDERIS, C. P., YOUNG, H. Y., AND CHUN, H. H. Q. 634.774: 612.014.44

Diurnal changes and growth rates as associated with ascorbic acid, titratable acidity, carbohydrate and nitrogenous fractions in the leaves of *Ananas comosus* (L) Merr.

Plant Physiol., 1948, 23: 38-69, bibl. 83, being *Tech. Pap. Pineapple Res. Inst. Univ. Hawaii* 172.

The variations in ascorbic acid content appeared to be connected with changes in the carbohydrate level: Sugars increased all day, while acidity decreased; this inverse relation suggests that acids are generated after oxidation of sugars. Soluble N increased and residual N decreased in daylight. These changes are discussed.

1442. TKATCHENKO, B. 634.774-1.532

Une méthode rapide de multiplication de l'ananás. (A rapid method for the reproduction of pineapples.) *Fruits d'Outre Mer*, 1947, 2: 371-3, bibl. 1, illus.

A method is described and illustrated in which short sections of stem, 1.5 to 2 cm. deep, each with several eyes, are propagated in sand on shaded beds. The shoots which

develop from these cuttings are cut off and grown in fertile soil on nursery beds until ready for transplanting in the field. Plants obtained by this method generally fruit in 2 years.

1443. WILLIAMS, C. G. 634.774-1.55

Harvesting, handling and packing of pineapples.

Qd agric. J., 1947, 65: 380-8, illus.

A description is given of the proper procedure for selecting, handling and packing pineapples in Queensland. There are 11 photographic illustrations of packing methods and a table showing the packing counts for pineapples packed in the tropical case (24½ × 12 × 12 in.). Two pages are devoted to a specification of the type of fruit required by pineapple canneries in Queensland.

1444. QUÉNOT, N. 634.8: 551.566.1

La vigne dans les pays tropicaux: culture, taille, entretien. (The grape-vine in the tropics: culture, pruning, and maintenance.) *Agron. trop.*, 1947, 2: 647-50, bibl. 1, illus.

Written for the French Sudan. Deals very briefly with choice of soil, the planting of cuttings, transplanting, tending, pruning, supporting, irrigation, watering and manuring.

1445. SPIELMAN, H. W. 588.83

Jaboticaba—"grape of Brazil".

Foreign Agric., 1948, 12: 18-19.

A popular account of the jaboticaba, *Myrciaria cauliflora*, an ornamental and useful native of Brazil. The tree takes 6 to 8 years to come into bearing, when it produces large quantities of grape-like fruits. It can stand occasional frost or drought, and has done fairly well in southern Florida.

Other crops.

1446. OCFEMIA, G. O., CELINO, M. S., AND GARCIA, F. J. 633.526.1-2.8

Further studies on transmission of bunchy-top and mosaic of abacá (manila hemp plant), separation of the two diseases and mechanics of inoculation by *Pentalonia nigronervosa* Coquerel.

Philipp. Agric., 1947, 31: 87-97, bibl. 20, illus.

Abacá may be readily infected with bunchy-top and mosaic, the presence of which two diseases in the same plant can easily be recognized. If abacá is infected with both diseases, the virus of bunchy-top may be drawn and transmitted to healthy abacá by *Pentalonia nigronervosa*, and the virus of the mosaic disease by the vectors of the latter. *P. nigronervosa* cannot transmit abacá mosaic; neither can the vectors of the abacá mosaic transmit bunchy-top of abacá. The vector of bunchy-top, *P. nigronervosa*, inserts its stylet either through the stomata or directly through the epidermis and pierces the tissue either intercellularly or intracellularly on its way to the phloem element. *P. nigronervosa* can also transmit bunchy-top through the roots of abacá seedlings. [From authors' summary.]

1447. BECKLEY, V. A. 633.85

Essential oils [in East Africa].

E. Afr. agric. J., 1948, 13: 180.

A note of warning for those in East Africa, and elsewhere, who might lightheartedly embark on the production of essential oils without knowing the many snags, some of which are mentioned.

1448. ANDRÉ, É. 633.85

Le beurre de karité, sa composition chimique, latex et graisse. (Shea butter, the chemical composition of its latex and fat.) *Oléagineux*, 1947, 2: 547-52, 599-603, bibl. 43, illus.

* From this issue *Foreign Agriculture* includes material of the type published formerly in *Agriculture in the Americas*, which has ceased to appear.

The introduction to this article contains interesting notes on the discovery, geographical distribution and varieties of *Butyrospermum parkii*, the fruits of which yield the shea butter of commerce. The greater part of the article is devoted to the subject indicated in the title.

1449. FRANÇOIS, R. 633.85

Contribution à l'étude de la fabrication du beurre de karité. (Contribution to the study of the extraction of shea butter [*Butyrospermum parkii*].)

Oléagineux, 1948, 3: 74-5, bibl. 7.

The production and quality of shea butter could be improved by mechanical extraction in the country of origin. The technical aspects are discussed with reference to the author's experiments.

1450. B[RAY], G. T. 633.854

Oil of *Tetracarpidium conophorum*.

Bull. imp. Inst. Lond., 1947, 45: 131-3, bibl. 11.

This drying-oil, frequently alluded to as conophor oil, has come into some prominence in recent years as a possible substitute for linseed oil in paint manufacture. It is also known by its native names of Awusa and N'gart. *Tetracarpidium conophorum*, which belongs to the *Euphorbiaceae*, is a woody vine found wild in tropical West Africa. The kernels of its fruit contain 48% to 60% of oil, the analysis of which is given. The residual oil-cake left after the extraction of the oil contains 45% of proteins. It is eaten by natives. Reference is made to the investigations into characteristics of this oil initiated by the Colonial Products Research Council and to the published results of the enquiry.

1451. AGNIHOTRI, B. N. 633.88

Petha [*Benincasa hispida*], its economic uses.

Punjab Fruit J., 1947, 11: 256-8.

Mainly devoted to a description of an improved method for preparing a confection from the fruit of this plant, the ash pumpkin. Its seeds are eaten and the waxy deposit on the fruit is said to have been used for making candles.

1452. LOUSTALOT, A. J., WINTERS, H. F., AND CHILDERS, N. F. 633.88.51-1.432

Influence of high, medium, and low soil moisture on growth and alkaloid content of *Cinchona ledgeriana*.

Plant Physiol., 1947, 22: 613-19, bibl. 7.

Seedlings of *Cinchona ledgeriana* were grown in chambers in which temperature and relative humidity were controlled. The soil moisture treatments, applied for 6 months, were: high—30% to saturation; medium—about 20%; and low—9% to 13% (wilting point=9.5%). Seedlings grown with low soil moisture were smallest, and their roots had significantly less quinine sulphate and total alkaloid than those of the others. Leaves of seedlings grown with high soil moisture developed necrotic spots between the veins, and many became yellow and fell; these symptoms, resembling those of magnesium deficiency or manganese toxicity in other plants, have been observed in field plantings at Toro Negro National Forest, Puerto Rico.

1453. BARTON, L. V. 633.88.51-1.531

Effect of different storage conditions on the germination of seeds of *Cinchona ledgeriana* Moens.

Contr. Boyce Thompson Inst., 1947, 15: 1-10, bibl. 7.

Storage at -4° , $+5^{\circ}$, and $\pm 24^{\circ}$ C., with moisture contents between 4.8 and 9.4%, indicates that temperature is more important than moisture in prolonging viability. In sealed containers seeds kept perfectly at the lower temperatures for up to 48 months.—Boyce Thompson Institute.

1454. LOUSTALOT, A. J., AND PAGÁN, C. 633.88.51

A quick and simple method for the determination of quinine and total alkaloids in cinchona bark. *J. Ass. off. agric. Chem. Wash.*, 1947, 30: 153-9, bibl. 4.

Apparatus necessary are a spectrophotometer suitable for measuring absorption at $380\text{m}\mu$ (using $30\text{m}\mu$ slit) and matched 1-cm. cuvettes as absorption cells. Reagents used are ethyl alcohol, calcium oxide, HCl, 0.1 N and U.S.P. XI quinine sulphate. Only 1 and 2 g. bark are needed. The method should enable cinchona seedlings to be evaluated at an early stage in their life cycle. Large numbers of seedlings can be dealt with quickly, either for the enlightenment of the breeder or for commercial purposes.

1455. I.C.S. 633.95

Carnauba wax.

Bull. imp. Inst. Lond., 1947, 45: 134-6, bibl. 11.

This wax is obtained from leaves of the South American palm *Copernicia cerifera* and is used mainly in the manufacture of polishes, floor waxes and carbon paper. The palm, which reaches a height of 12 to 15 metres, begins to produce wax at 10 years, the maximum yield being reached at about 50 years. The main producing area is N.E. Brazil, a semi-arid region with long dry seasons. A short-note is given on harvesting the leaves and collecting the wax [which occurs as a thin layer on the under surface of the leaves]. The average yield of wax is said to be 6-7 g. per leaf, 10 to 15 leaves being cut from a palm in the course of a year.

1456. COOK, O. F. 585.45

Cascade palms in Southern Mexico.

Nat. hort. Mag., 1947, 26: 10-34, illus.

A long, illustrated description is given of a group of small, ornamental palms in which the trunk is reduced to a short-jointed creeping rhizome. The generic name of *Vadia* is suggested for them in reference to their habitat, the stream-bed of mountain cascades. They are suitable as pot plants indoors. A palm like *Vadia*, for which the generic name of *Encheila* is suggested, is also described.

1457. ORIAN, G. 585.45: 632.3

Bud rot of the Royal Palm [*Oreodoxa regia*] in Mauritius.

Rev. agric. Maurice, 1947, 26: 223-58, bibl. 42, illus.

Evidence is produced to show that this disease is caused by *Xanthomonas vasculorum*, the bacterium causing gumming disease of sugar-cane.

1458. ERHART, H. 634.6-1.4

La vocation des sols tropicaux pour la culture des plantes oléagineuses. (The suitability of tropical soils for oil plants [Part I. The oil palm].)

Oléagineux, 1948, 3: 1-12.

For the profitable cultivation of the oil palm, only the best soils, comparable to volcanic soils of the Netherlands East Indies, should be used. The fact that the oil palm survives in Africa on a wide range of soil types does not justify regarding them all as oil palm soils.

1459. DEVUYST, A. 634.61: 551.57

Influence des pluies sur les rendements du palmier à huile. (The effect of rainfall on oil palm yields.)

Oléagineux, 1948, 3: 137-44, bibl. 6.

At La Mé, rainfall ceases to limit growth and yield when it exceeds 300 mm. per month; the "useful" rainfall is obtained by recording only 300 mm. for any month in which this amount is exceeded. The number of bunches harvested annually depends on the "useful" rainfall for the 12-month period 33 months before, in which the flower buds were being formed. The annual mean bunch weight depends on the "useful" rainfall from the 33rd to the 6th month before the harvest period, i.e. from the time of flower bud formation to anthesis. Oil palm yields can be predicted nearly two years in advance, as bunch number is more important than bunch weight.—La Mé, Ivory Coast.

1460. HALE, J. B. 634.61-2.19
Mineral composition of leaflets in relation to the chlorosis and bronzing of oil palms in West Africa.
J. agric. Sci., 1947, 37: 236-44.
Some disorders causing chlorosis and necrosis of the foliage of oil palms from three West African estates [in Nigeria] have been investigated by spectrochemical analysis of the dry leaflets for potassium, calcium, magnesium and manganese. Statistical examination of the chemical analyses of leaflets from fronds of different ages, and from different positions along the frond, shows that it is important to sample and analyse separately at least upper, middle and lower fronds from each tree. Little is gained by analysing separately samples from different positions along the length of the frond. The "bronzing" diseases are tentatively ascribed to deficiency of potassium. One palm is probably a case of combined magnesium and potassium deficiency. One disease, "lemon frond", cannot be attributed to a deficiency of any of the elements determined. The differences in mineral composition of the leaflets between palms from the three estates are greater than those due to the diseases, and a further survey is proposed to determine the range of variation of composition of healthy trees and the levels below which deficiencies set in. [Author's summary.]
1461. PEIRIS, H. A., AND CHANDRARATNA, M. F. 635.262
Cultural studies with garlic (*Allium sativum* L.). I. Variety, spacing and manurial trials at Palugama and Boralanda [Ceylon].
Trop. Agriculturist, 1946, 102: 202-5 [received 1948].
The outstanding variety in the yield trials was Mallaipoodu-1945, an introduction from India. Yields at both centres increased *pari passu* with closeness of spacing, the closest spacing being 4 in. x 4 in.
1462. CLAYTON, C. N. 635.648
Effect of several seed protectants on emergence and stand of okra.
Phytopathology, 1948, 38: 102-5.
Treatment of okra [*Hibiscus esculentus*] seed with New Improved Ceresan at the rate of 4 oz. Spergon at 16 oz. or Arasan at 4 oz. per 100 lb. of seed was beneficial, and also, but to a less degree, Fermate, 2% Ceresan, or Semesan. Soaking the seed in water for several hours prior to seeding resulted in a decrease of stand.—S. Carolina Truck Experiment Station.
1463. AKAMINE, E. K. 635.976
Germination of *Azystasia gangetica* L. seed with special reference to the effect of age on the temperature requirement for germination.
Plant Physiol., 1947, 22: 603-7, bibl. 4, being *Tech. Pap. Hawaii agric. Exp. Stat.* 155.
The seeds of this tropical ornamental shrub remain dormant for some months. If the seed coat is removed, about 75% germinate, but better germination is obtained by subjecting the seeds to alternating temperatures. A wide variation in temperature is needed to break the dormancy of young seeds; less drastic treatment is adequate for older seeds, and after about 135 days dormancy ends naturally.

Noted.

1464. a CRANDALL, B. S. 633.88.51-2.411
Cinchona root disease caused by *Phytophthora cinnamomi*.
Phytopathology, 1947, 37: 928-9.
b DANSEREAU, P., AND SEGASDAS-VIANNA, F. 581.9(81)
The high mountain vegetation of southeastern Brazil.
Bull. ecol. Soc. Amer., 1947, 28: 48.
- c DE FLUITER, H. J. 633.73-2.752
Onderzoekingen omtrent *Pseudococcus citri* (Risso, 1813), de dompolanluis van de koffie, en haar bestrijding. (Observations on *Pseudococcus citri* (Risso, 1813), the white coffee mealybug, and its control. Part I: Biology, ecology and epidemiology.) [English summary 4 pp.]
Arch. Koffiecult. Ned.-Ind., 1941, 15: 1-119, bibl. 36 [received 1948].
- d GADD, C. H. 633.72-2.76
Studies of shot-hole borer of tea. III. Damage to the tea bush.
Tea Quart., 1947, 19: 96-101, bibl. 7.
- e GIESBERGER, G. 633.74-2.752
Eenige waarnemingen over de aantasting van cacao door *Helopeltis*. (Observations on *Helopeltis* attacking cacao.)
Arch. Koffiecult. Ned.-Ind., 1940, 14: 44-99, bibl. 13 [received 1948].
and
Bestrijding van *Helopeltis* bij cacao met lood-arsenaat. (The control of *Helopeltis* on cacao using lead arsenate.)
ibid., 1940, 14: 100-2, bibl. 1 [received 1948].
- f VAN LAERE, R. 634.774
Notice sur la culture de l'ananas au Bas-Congo. (Pineapple cultivation in the Bas-Congo.)
Bull. agric. Congo belge, 1947, 38: 881-6.
- g LAMBERS, M. H. R. 633.73
Het onderkennen van koffiecloonen. (The identification of coffee clones [grown in the Netherlands East Indies].)
Arch. Koffiecult. Ned.-Ind., 1938, 12: 165-89, bibl. 10 [received 1948].
- h LEVERT, P. H. 633.74-2.752
Het mier-luis-complex bij cacao en verdere gegevens over *Helopeltis*-aantasting. (The ant-mealybug complex in cacao and further data on the control of *Helopeltis*.)
Arch. Koffiecult. Ned.-Ind., 1940, 14: 1-43, bibl. 16 [received 1948].
- i LOMBARD, F. F. 016: 633.88.51-2.1/8
Review of literature on cinchona diseases, injuries, and fungi.
Bibl. Bull. U.S. Dep. Agric. 9, 1947, 70 pp., bibl. 290.
- j MANNING, J. D. 633.72-2.4
Developments in the blister blight situation: October/November 1947.
Plant. Chron., 1948, 43: 55-6.
- k VAN DER MAREL, H. W. 631.4: 551.566.1
Tropical soils in relation to plant nutrition.
Soil Sci., 1947, 64: 445-51.
- l MEIJER, W. H. 633.73
Beschouwing over koffiehoutgradaties, entrijkskeuze en entrijksvermeerdering op grond van praktijkwaarnemingen. (Practical remarks on the classification of coffee wood and the choice and multiplication of grafting material.)
Arch. Koffiecult. Ned.-Ind., 1939, 13: 50-69, bibl. 2 [received 1948].
- m FRÄLTZER, A., AND DE FLUITER, H. J. 633.73-2.4
De wortelluisschimmel, *Polyporus coffeae* Wakef. (Observations on *Polyporus coffeae* [associated with the root mealybug *Pseudococcus deceptor* on robusta coffee in Java].) [English summary 1 p.]
Arch. Koffiecult. Ned.-Ind., 1941, 15: 121-42, bibl. 47 [received 1948].

- n **PIERIS, W. V. D.** 634.61
An essay on the uses of the coconut palm together with an illustrated guide to coconuts.
 Coconut Research Scheme, Ceylon, 1936, pp. 12 + 50 plates [received 1948].
- o **ROELOFSEN, P. A.** 633.73
 Onderzoekingen over beïnvloeding en behoud van de kwaliteit van robusta-marktkoffie. (Altering and maintaining the market quality of robusta coffee.) [English summary 5 pp.]
Arch. Koffiecult. Ned.-Ind., 1939, 13: 151-281, bibl. 65 [received 1948].
- p **SNOEP, W.** 633.73-1.55
 Enkele gegevens over de bloeigrootte en het bloeiendement, als productiefactoren, bij robusta-koffie. (The effect of flower intensity and fruit setting upon the yield of robusta coffee.) [English summary 1½ pp.]
Arch. Koffiecult. Ned.-Ind., 1940, 14: 247-73, bibl. 10 [received 1948].
- q **VAN DER VEEN, R.** 633.73-2.796
 Termietenplagen in koffie. (Termites attacking coffee.) [English summary ½ p.]
Arch. Koffiecult. Ned.-Ind., 1941, 15: 187-205, bibl. 3 [received 1948].

STORAGE.*

1465. **HUKILL, W. V., AND SMITH, E.** 664.85.11.037
 The cold storage of apples.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 867-70, bibl. 6.

A popular account of cold storage practice in the U.S.A. Recent progress in apple storage methods have resulted largely from closer attention to practical means for providing optimum storage conditions rather than to new discoveries or revolutionary changes of method.

1466. **DUSTMAN, R. B., MEADE, R. C., AND FISH, V. B.** 664.85.11: 632.95
 Pectic content of apples in relation to thiocyanate sprays.
Plant Physiol., 1948, 23: 142-8, bibl. 8, being
Sci. Pap. W. Va agric. Exp. Stat. 378.

The effect of thiocyanate sprays on the pectic fractions of apples of fifteen varieties was followed during storage. Spraying decreased titratable acidity, apparently retarded the transformation of protopectin to pectin in storage, and was without effect on the total amount of pectic substances.

1467. **KIDD, F., AND WEST, C.** 664.85.11
 A note on the assimilation of carbon dioxide by apple fruits after gathering.
New Phytol., 1947, 46: 274-5.

Two experiments were carried out, one with Bramley's Seedling apples gathered on 25 June (av. fresh weight 40 g.), and another with Bramley's gathered on 8 September (av. fresh weight 115 g.). The experiments were carried out in the orchard without temperature control. Both the fruit kept in the dark and that exposed to daylight were shielded from direct sunlight and were at sensibly the same temperature. The first experiment covered a period of 10 days from picking, the second was continued for 3 months. In both CO_2 production was considerably less in the light than in the dark. It seems probable that the photosynthetic activity of the fruit per unit surface is a tenth or less of that of the leaf and that the contribution to the increase in dry weight of the fruit during its growth made by photosynthesis in the fruit itself is small.

1468. **FISHER, D. F., AND COOLEY, J. S.** 664.85.11: 632.1
 Apple scald and its control.
Fmrs' Bull. U.S. Dep. Agric. 1380, 1947, pp. 9.

The following recommendations are made: (1) Store only mature, well-coloured fruit. (2) Store fruit at 30° to 31° F. as soon as possible after harvest. (3) When it is impossible to store fruit immediately after harvest, keep it in the shade and give it free exposure to air. (4) Keep atmosphere in the storage room at 85% to 90% relative humidity. (5) Wrap fruit in oiled (not waxed) paper at harvest or within not more than 2 months from harvest, or scatter shredded

oiled (not waxed) paper throughout packages of non-wrapped fruit. The oiled paper should carry at least 15% of its finished weight in odourless, tasteless mineral oil. (6) Use well-ventilated packages and stack so that air can circulate freely. (7) Market apples not protected by oiled paper before scald develops (usually within 60 to 90 days from harvest).

1469. **VAN HIELE, T.** 664.85.11
 Over den invloed van het aanbrengen van een papier-bescherming in het fust op de bewaareigenschappen van het fruit 1943/44. (On the effect of using paper protection in the barrel on the keeping quality of fruit 1943/44.)
Meded. Direct. Tuinb., 1946, pp. 100-6 [received 1948].

In cool storage the use of paper in the boxes for protection had no effect on the final product. The final percentage of the marketable product in the protected boxes at the end of the experiment was less than in controls, a result to be attributed to the appearance of scald within the paper covering. The apple variety used in the trial was Belle de Boskoop which is particularly liable to scald.

1470. **SCHOMER, H. A., AND MCCOLLOCH, L. P.** 664.85.11.035.1
 Ozone in relation to storage of apples.
Circ. U.S. Dep. Agric. 765, 1948, pp. 24, bibl. 27.

Apples were stored at 31° F. and 88% relative humidity in an atmosphere to which ozone was added. Up to 3.25 p.p.m. of the gas failed to control decay or scald, but the development of each disorder was reduced; at this concentration ozone injured the fruit and impaired the taste of all varieties used except Golden Delicious. Neither injury nor impairment of flavour was caused by daily exposure to 1.95 p.p.m. for 5 months.

1471. **ATKINS, J. G., Jr.** 664.85.11: 632.4
 Molds on apple storage containers and their control.
Abstr. in Phytopathology, 1948, 38: 1.

Moulds isolated from apple containers are enumerated. In storage tests with treated containers good control was obtained with Dovicides B, F, G and S, Thiosan, Spergonex, Cuprinol, Roccal, Phygon, and silver nitrate. Apples in direct contact with treated containers were injured by Spergonex, Cuprinol, and Dovicides B, F, G and S.

1472. **BOVAY, E.** 664.85.872.037
 Le raisin de table et sa conservation en frigorifique. (Cold storage of dessert grapes.)
Rev. romande Agric. Vitic., 1947, 3: 51-2.

Dessert grapes can be stored satisfactorily for 3½ months at a temperature of 1° C., and a relative humidity of 90%, if they are disinfected every 10-15 days with SO_2 . The gas is generated by the reaction of potassium metabisulphite and sulphuric acid, and is applied at the rate of 15 g. per cubic metre of storage space; the store is ventilated thoroughly 24 hours later.—Lausanne.

* See also 1195-1202.

1473. KLOTZ, L. J., AND ZENTMYER, G. A.

664.85.3: 632.4

Control of brown rot and oleocellosis of citrus fruit in the packinghouse.

Abstr. in *Phytopathology*, 1947, 37: 844.

If brown rot infection of lemons (incubation at 60°-65° F.) took place more than 10 hours previous to immersion in cold fungicides, the decay was unchecked. If the period of incubation (at 60° F.) was 30 hours or less, brown rot could be stopped by 4 minutes immersion in water at 120° F. To endure the hot immersion without surface breakdown (oleocellosis) the lemons must be slightly wilted by letting them stand 3 to 7 days after picking. Exposing inoculated lemons to hot moist air (100°-104° F., 95% R.H.) not only stopped brown rot even after 35 hours incubation at 53° F., but conditioned the fruit so that no rind oil was liberated during the hot immersion.

1474. ANON.

632.944

Fumigation with methyl bromide.

May & Baker Ltd., Dagenham, England, 1948 [?] pp. 52, bibl. 194.

HOME OFFICE.

Fumigation with methyl bromide, precautionary measures.

H.M. Stationery Office, London, 1947, pp. 8.

The first writer reviews many reports of the use of methyl bromide against insect pests of seeds, plants, fruits and stored products; the second stresses the risks accompanying its use and lays down precautionary measures to avoid accidents.

1475. WARDLAW, C. W.

664.85: 551.566.1

Tropical fruits: their storage and transport.

Endeavour, 1947, 7: 32-8, bibl. 2, illus.

After a brief discussion of the application of refrigerated transport to tropical fruits the author turns to the physiological problems involved, describing the maturing fruit as a variable biological system, which undergoes a succession of complex changes in relation to inherent factors and factors of environment. So far, only a very few tropical fruits—chiefly the banana and citrus fruits—have received close physiological study. Others, such as avocados, mangoes and pineapples, have received some attention, but tropical fruits in general still remain practically untouched by physiological investigations and thus offer a field of magnificent opportunity for research. The bulk of this authoritative article is devoted to an account of the physiological, biochemical and other changes which take place in the banana during cool storage, transportation and after-ripening. Gas storage is also discussed and the different metabolic trends of gas-stored fruit are compared with fruit in air. It is anticipated that the commercial gas storage of bananas will be achieved by a system of restricted ventilation in conjunction with the removal of excess CO₂ by chemical means, and that in due course data will be available for the construction of ships' holds suitable for gas storage of tropical fruits. The final section of the article is devoted to a brief consideration of the possibilities of transporting other tropical fruits by sea and air.

1476. CALDWELL, N. E. H.

664.8: 632.6/7

Stored product pests in Northern Queensland.

Qd J. agric. Sci., 1947, 4: 7-11.

The relative importance of 34 pest or potential pest species

is recorded in tabular form, including those found in leguminous seeds and seed products, dried fruits, nuts and nut meats, tobacco and other dried plant products.

1477. ULRICH, R., AND LEBLOND, C. 664.85.53.035.1

Sur l'entreposage frigorifique des châtaignes en atmosphère contrôlée. (Cold gas storage of chestnuts.)

C.R. Acad. Agric. Fr., 1947, 33: 478-81.

Chestnuts were placed in gas storage (at 0° C.) in October and maintained in an atmosphere of approximately 10% oxygen, 10% carbon dioxide, and 80% nitrogen, and examined in the following February and April. The differences in quality (for nuts that were sound, diseased, worm-eaten or had a disagreeable flavour) observed in February and April were negligible.

1478. DAS NEVES BARRETO, M.

664.85.037 + 664.84.037

A conservação frigorífica das frutas e dos produtos horticolas. Refrigeração imediata. (Quick freezing of fruit and vegetables.)

Bol. Junta nac. Frutas, Lisbon, 1947, 7: 160-5.

The advantages of shortening the period between harvesting fruit and vegetables destined for cold storage and the beginning of refrigeration are discussed. Attempts at refrigeration during packing proved uneconomic, and the recommendation is to carry out the freezing as soon as possible but after the products have been selected and packed.

1479. MOERMAN, J. A. S.

664.84/85.037

Samenvattend overzicht van de proefnemingen met snelgevroren producten. (A summary of experiments with quick-freeze products.)

Meded. Direct. Tuinb., 1947, 10: 566-73.

The results of trials of quick freezing various kinds of vegetables and soft fruits are described, and the varieties which gave the most promising results are indicated.

1480. LINDNER, R. C., IKEDA, W., AND AWADA, M.

664.85.037: 551.566.1

Quick-freezing of tropical fruits.

Bienn. Rep. Hawaii agric. Exp. Stat. 1944-46, 1947, p. 119.

"Studies on the quick-freezing of Hawaiian-grown tropical fruits such as mango, papaya, litchi, longan, guava, Surinam cherry, pineapple, and banana show that all these fruits can be satisfactorily frozen. The litchi is of particular interest for it can be frozen whole, involving a minimum of handling. The natural cover of the fruit is a good packaging material in itself and the whole frozen fruit makes an attractive product. The litchi can also be peeled and frozen in a syrup as is done with most other fruits. Twenty different varieties of mangoes have been tested for their freezing quality. While there is considerable variation as to variety, environmental factors appear to be of equal importance to varietal factors in affecting fruit quality. All of the varieties tested could probably be made to produce satisfactory frozen packs if they were grown properly. The average amount of usable pulp from all varieties of mangoes amounted to 57.4% of the fresh weight with a range from 43.7 to 67.3%."

PROCESSING AND PLANT PRODUCTS.*

1481. TAVERNIER, J. 634.11: 577.16
La teneur en vitamine C des pommes de table.
(The ascorbic acid content of dessert apples.)
Rev. hort. Paris, 1948, 120: 5-9, bibl. 8.
In the apple the concentration of ascorbic acid is greater in the skin than in the flesh, and greater in the red parts of bi-coloured fruits. Early harvesting does not affect ascorbic acid content, nor does storage for 2 or 3 months; but over-ripe fruits contain less.—Station de Recherches Pomologiques, Cidricoles, et Laitières de Rennes.
1482. DA PIEDADE ABREU, A. 613.2: 634.1/8
O valor alimentar da fruta consumida em Lisboa, em 1946. (The nutritional value of fruit eaten in Lisbon in 1946.) [Summary in English and French.]
Bol. Junta nac. Frutas, Lisbon, 1947, 7: 166-81.
The quantities of different kinds of fruit eaten in Lisbon in 1946, their nutrient value, vitamins and mineral salts are tabulated. It is concluded that the fruit consumed supplied the annual needs of the population at the following rates: vitamins A, 5.4%; B₁, 1.4%; B₂, 1.6%; C, 42.0%; calcium, 1.5%; phosphorus, 2.1%; and iron, 1.4%.
1483. KLOSE, A. A., PEAT, J., AND FEVOLD, H. L. 634.51: 577.16
Vitamin C content of walnuts (Persian) during growth and development.
Plant Physiol., 1948, 23: 133-41, bibl. 9.
The vitamin C content of walnut hulls decreased till, at maturity, it was 6% to 8% of the dry weight. More than 90% of the vitamin C as determined by the indophenol test was ascorbic acid.—Western Reg. Res. Lab., Albany, Calif.
1484. CAPT, E. 663.813 + 663.25
Quelques résultats de recherches récentes sur le sulfitage des moûts et vins. (Some results of recent research on the sulphiting of musts and wines.)
Rev. romande Agric. Vitic., 1947, 3: 35-7.
The amount of free SO₂ produced by a given addition depends on the age, vintage and source of the must or wine, and on previous treatments. Doses of between 10 and 15 g. SO₂ per hectolitre may be added before fermentation ends without lowering the quality.—Lausanne.
1485. AMERINE, M. A., AND WINKLER, A. J. 634.8(794): 663.25
Composition and quality of musts and wines of California grapes.
Hilgardia, 1944, 15: 493-676, bibl. 74 [received 1948].†
A very full and excellently documented account of the *vinifera* grape varieties found most suitable for particular red or white wine making in 5 separate regions of California. Numerous data are tabulated on the composition of the musts and wines of the more important varieties and they include records of tasting tests. This bulletin should be of very great use, wherever wine is made from *vinifera* grapes.
1486. BENVENIGNI, L., AND CAPT, E. 663.813
Détermination du degré de sonde des moûts au moyen du réfractomètre. (Using the refractometer to test musts.)
Rev. romande Agric. Vitic., 1947, 3: 82-3.
Conversion en degrés Oechsle des indications du réfractomètre à jus de raisin. (Conversion of refractometer readings of grape juice to Oechsle degrees.)
ibid., 1947, 3: 93-4.
* See also 1252-1254.
† *Hilgardia* was unobtainable by our abstractors for some years. We are now receiving it regularly again.
- The first paper describes the use of a small hand refractometer to measure the sugar content of small samples of grape juice. The second contains a table of temperature corrections and one for converting the corrected readings to density in Oechsle degrees.—Lausanne.
1487. MARSHALL, R. E. 663.813: 634.11
Apple juice, preparation and preservation.
Circ. Bull. Mich. agric. Exp. Stat. 206, 1947, pp. 68, bibl. 26, illus.
An account of the whole process of apple juice production on a commercial scale in a modern plant in Michigan with notes on choice of varieties, plant layout and nutritive value and the *pros* and *cons* of fortifying with ascorbic acid.
1488. POE, C. F., AND FIELD, J. T. 663.813: 634.11
Fermentation of apple juice and the effects of its preservation by cold and sodium benzoate.
Fruit Prod. J., 1947, 27: 112-16, 123, bibl. 17.
Sodium benzoate was of little value, at 20° C., as a preservative for juice of Jonathan and Ben Davis apples. Raw juice remained practically unchanged for 60 days when stored in glass at 5° C., but deterioration was more rapid in crockery and in wood at this temperature.—University of Colorado.
1489. MILLEVILLE, H. P. 663.813
Present status of the manufacture and use of volatile fruit concentrates.
Fruit Prod. J., 1947, 27: 99-102, 121, bibl. 3.
The term "volatile fruit concentrate" is proposed to describe more accurately products recovered by the author's general process (*ibid.*, 24: 48-51; *H.A.*, 15: 896), which is being developed for other fruits. Legal points complicate the commercial use of volatile apple concentrate in the United States at present, e.g. if it contains more than 0.5% alcohol it is taxable and may be produced only under licence; and its addition to apple jelly is regarded as adulteration.
1490. LAVOLLAY, J. 663.813
Les sous-produits de l'industrie des jus de fruits. (By-products of the fruit juice industry.)
Fruits d'outre Mer, 1947, 2: 354-9.
The author sets out to show that the by-products of the fruit juice industry could be of commercial value if properly recovered and treated. Figures are given showing the chemical analysis of various kinds of fruit waste including apple pips, grape skins, tomato skins and pips, citrus and pineapple residues. The kernels of apricots, peaches, plums and cherries contain 30-54% of oil. The utilization of various forms of fruit waste and the value of the recoverable by-products (pectins, oil, etc.) are briefly discussed.
1491. LEE, F. A., BEATTIE, H. G., AND PEDERSON, C. S. 663.813: 635.25
Onion juice concentrate prepared by freezing concentration.
Fruit Prod. J., 1948, 27: 141, 153, bibl. 7.
Onion juice concentrated to 56° Brix by freezing and centrifuging was stored for two years at room temperature without losing its flavour. No preservative was necessary.
1492. CRUESS, W. V. 635.64: 663.813
Tomato juice.
Fd Manuf., 1948, 23: 158-63, bibl. 8.
An account of the various commercial processes used in the United States for canning tomato juice. The procedures for counting moulds and insect fragments are indicated.
1493. SUMNER, C. A. 664.85.323.036.5
Control of Brix cut-out in the canning of grapefruit sections.
Fruit Prod. J., 1948, 27: 203-5.
The "cut-out" Brix value (attained when equilibrium

between sugar in fruit and syrup is reached 10 to 18 days after processing) can be quickly estimated by macerating a sample of grapefruit sections in syrup. Graphs can be constructed to use this estimate for deciding the minimum amount of sugar needed to obtain any cut-out value.

1494. CHARI, C. N., AND OTHERS. 664.85.22.047
The effect of blanching and dehydration on enzyme activity and storage quality of high moisture unprocessed prunes.

Fruit Prod. J., 1948, 27: 206-11, bibl. 6.

A disagreeable flavour may develop in prunes with a moisture content greater than 18%, when storage is prolonged. Where prunes are packed on a small scale their flavour can be preserved by the following procedure. After dehydration to 29 to 32% moisture at not more than 165° F., the fruit is blanched in live steam for 4 minutes. When cool it is packed in moisture-proof bags, sterilized by the addition of propylene oxide and sealed immediately.—University of California.

1495. ZWEEDE, A. K. 664.85: 632.1
Oxydatieve bruine verkleuringen bij vruchtenproducten. (The origin of brown discoloration in fruit products.)

Meded. Direct. Tuinb., 1947, 10: 390-7, 446-53, bibl. 14.

The literature on the brown discoloration in fruit products is reviewed. The author describes his own preliminary experiments on the application of antioxidants to apples, pears and plums subjected to deep freezing. Ascorbic acid and thiourea gave the most satisfactory results. Common salt and extracts from rose hips had some effect, but there were disadvantages.

1496. ANON. 634.62-1.57
Date meal.
Food and Agric., 1947-48, 1: 214.

The manufacture of date meal is increasing in Algeria. The meal, made from the local surplus of common dried dates, contains approximately 55% saccharose, 18% glucose and 2% cellulose.

1497. FABIAN, F. W., AND BLUM, H. B. 664.84.63-035.4

The Lixate method of salting cucumbers.
Fruit Prod. J., 1947, 27: 103-6, being *J. Art. Mich. State Coll.* 912 (n.s.).

The Lixate method produced salt stock pickles as satisfactory as did a combination of brine and dry salting. It automatically provides a piped supply of saturated brine, which is used to regulate the salinity of the pickling tanks.

1498. CULPEPPER, C. W., AND OTHERS. 633.842: 664.84-036.5

The utilization of sweet peppers. Part I. Canning.
Fruit Prod. J., 1948, 27: 132-40, 153, 164-8, bibl. 27.

Comprehensive canning tests were made with the fruit of 43 varieties of sweet pepper. Ripe fruit made the most acceptable product, whether peeled before canning or not; peeling was facilitated by dipping the fruits into boiling lye (12-15% of commercial conc. NaOH) for 25 to 40 seconds and washing them. The acidity of the fruit is such that steam processing at 227° or 240° F. is recommended. Ascorbic acid ranged from 140 to 276 mg. and carotene from 0.58 to 4.13 mg. per 100 grams of ripe fruit. The canned material retained 80% of the ascorbic acid and all the carotene after 5½ months storage. The varieties are arranged in order of commercial value for canning.—Division of Fruit and Vegetable Crops and Diseases, U.S.D.A.

1499. HERRICK, H. T. 633/635
New uses for farm crops.
Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 689-98.

An outline of the work and some of the achievements of the four Regional Research Laboratories opened in the U.S.A. in 1940-41 for research into new uses for agricultural raw materials. Work at the Eastern Laboratory (Wyndmoor, Pa) includes studies of tobacco, vegetables and apples, while the programme of the Western Laboratory (Albany, Calif.) embraces research into fruit and vegetables, including dehydration.

1500. WILLAMAN, J. J., AND ESKEW, R. K. 635.1/7: 631.57

Uses for vegetable wastes.

Yearb. Agric. U.S. Dep. Agric. 1943-47, pp. 739-43, bibl. 2.

Investigations by the Eastern Regional Research Laboratory U.S.A., into the utilization of vegetable wastes have resulted in the production, on an experimental scale, of high quality leaf meals with protein contents of 25% or more. Reference is made to leaf meals made from beans, beet, broccoli, carrots, celery, collards, kale, lemon-grass, lettuce, peas, ramie, rhubarb, spinach, swedes, sweet potatoes, turnips. A description is given of the drying process used. It is estimated that the cost of leaf meal would be \$22 to \$95 per ton, depending on the raw material used.

1501. WHITE, J. W., AND OTHERS. 581.192: 631.56
Protoplasts from plant materials.

Industr. Engng Chem., 1948, 40: 293-7, bibl. 13.

The recovery of protein and carotene from waste leaves and other tissues can be facilitated by anaerobic fermentation with *Clostridium roseum*. From carrot roots concentrates containing up to 2.2% carotene were obtained without solvent extraction.—Eastern Regional Research Laboratory, Philadelphia, Pa.

1502. DEXTER, S. T., AND CREIGHTON, J. W. 631.563.2
A method for curing farm products by the use of drying agents.

J. Amer. Soc. Agron., 1948, 40: 70-9, bibl. 5.

The drying agents were chlorides used to impregnate porous wood blocks.

1503. RAYMOND, W. D. 631.563.2
An alarm for pyrethrum and papain driers.

E. Afr. agric. J., 1948, 13: 159.

A description and sketch of a small device designed to warn managers when their staff overtook a drier. When a certain predetermined maximum temperature is exceeded, a bimetallic strip closes an electric circuit, thus operating a bell and warning light.—Chemical Lab., Dar es Salaam.

1504. HOMANS, L. N. S., VAN DALISEN, J. W., AND VAN GILS, G. E. 633.912: 581.192
Complexity of fresh Hevea latex.

Nature, 1948, 161: 177-8, bibl. 3.

An account is given of work carried out at the Netherlands Indies Rubber Research Institute, Buitenzorg, Java, during the war with Japan. When fresh latex is centrifuged it separates into a white and a heavier yellow fraction in ratios between 2/1 and 9/1. The white fraction has a higher content of rubber and total solids, is less viscous, and coagulates less rapidly. The difference in the rate of coagulation is probably due to the concentration of enzymes in the yellow fraction, which is rapidly discoloured by oxidation. It is suggested that the increased viscosity of the yellow fraction is due to the formation of macrocoacervates by centrifuging, from microcoacervates present in the fresh latex.

1505. SMITH, H. F. 633.912: 581.192
Use of hydrometers to estimate dry rubber content of latex.

J. Rubb. Res. Inst. Malaya, 1947, 12: 47-61, bibl. 15, being *J.R.R.I. Commun.* 263.

Owing to the viscosity of latex the Metrolac, Latexometer and Simplexometer hydrometers cannot be used satisfactorily in undiluted fresh latex, and observations are

usually made in latex-water mixtures. The scale adopted for these instruments to estimate d.r.c. from the observation of density is that appropriate to mixtures of "average" latex of about 35% d.r.c. with water. The estimate of d.r.c. may be seriously in error when the original latex deviates markedly from the assumed average. Agreement of factory output with latex weights \times Metrolac (etc.) observations gives no check on the reliability of individual readings. The average bias of a set of observations (e.g. of tappers' returns) may be adjusted on the basis of factory output; but the amount of rubber brought in by an individual tapper will be over- or under-estimated by about 3% for each unit of per cent. d.r.c. by which his original latex has tapped exceeds or is less than the average of the batch. Variation of temperature, without correction being made for it, will produce errors in estimates of per cent. d.r.c. of the fluid observed. In estimating d.r.c. or original latex from 1 : 2 dilutions with water the error will be about 1 per ° C. (1.8° F.). Possibilities for improving on the current method of obtaining hydrometric estimates of d.r.c. are discussed. [From author's summary.]

1506. DAVEY, W. S., AND SEKAR, K. C. 633.912-1.56

The evaluation of creaming agents.

J. Rubb. Res. Inst. Malaya, 1947, 12: 62-77, bibl. 5, being *J.R.R.I. Commun.* 264.

A description is given of the factors which should be considered in the evaluation of creaming agents, indicating that the initial cost should be balanced against that of the service it gives and the influence it has on quality. The efficiency of a creaming agent in service is measured by the optimum amount required under specified conditions of preparation and testing. A method of determining the optimum is described and some observations are made on the manner in which this is affected by the manufacture, preparation and keeping properties of a number of the commonly used creaming agents. The theories advanced to explain the mechanism of creaming are reviewed and the general differences between creamed and centrifuged latex enumerated, but little information is available to enable discrimination to be made between latex prepared by different creaming agents. [Authors' summary.]

NOTES ON BOOKS AND REPORTS.

1508. ARTISS, P. 635.1/7+635.9

Market gardening. A practical guide to the commercial cultivation of flowers and vegetables. W. H. and L. Collingridge, London, 1948, pp. 127, illus., 5s.

The title tells you all. The author himself has no illusions of an easy road to success in market gardening. The first essentials are an inner compulsion that drives one irresistibly to the land and then plenty of practical training. If that does not suffice to break the neophyte's heart, then the hints given in this admirably business-like little book should signpost him to success and a shrewd temperament may lead him there. The book contains no whimsies or fancies, merely sound common sense derived from personal experience. Specialized branches such as mushroom growing and anemones are not included, but most of the vegetables and flowers commonly grown in the south of England are dealt with in turn.

1509. BARNES, H. F. 632.77: 634.1/8

Gall midges of economic importance. Vol. III. Gall midges of fruit.

Crosby Lockwood & Son Ltd., London, 1948, pp. 184, 17 figs., 15s.

The appearance of this volume, which deals with more than one hundred species of gall midges associated with nearly fifty host plants, will be specially welcomed not only by applied entomologists but by those who desire information on this lesser known group of fruit pests.

While it is only the gall midge specialist who is capable of identifying correctly the species of Cecidomyiids, the non-

1507.

a AJON, G. 634.334-1.56
Piccola industria dell'acido citrico. (Instructions for small scale citric acid production.) *Ann. R. Staz. sper. Frutt. Agrum. Acireale*, 1941, 16: 125-36, bibl. 5. [received 1948].
From lemons.

b ALTMAN, R. F. A. 633.912: 581.192
Natural vulcanization accelerators in hevea latex. *Industr. Engng Chem.*, 1948, 40: 241-9, bibl. 95.

c ALVAREZ, A. S. 633.61
Normas para la realizacion del control quimico de las fabricas de azucar de caña. (Chemical control for cane sugar factories.) *Bol. Estac. exp. agric. Tucuman* 59, 1946, pp. 59, bibl. 12.

d DESCHREIDER, A. R., AND VAN DEN DRIESSE, S. 581.192

Methods for the estimation of pectin.

Food Manuf., 1948, 23: 77-83, bibl. 7.

e VAN HIELE, T. 664.85
Verwerking en opslag van fruit. (Processing and storing fruit [in Belgium].) *Meded. Direct. Tuinb.*, 1947, 10: 742-54, illus.

f KNAUS, C. 633.74-1.56
Gegevens en proeven over de cacao bereiding. (Data and experiments on the preparation of cocoa.) *Arch. Koffiecult. Ned.-Ind.*, 1934, 8: 27-79, bibl. 47 [received 1948].

g MCCOLM, E. M., AND HAEFELE, J. W. 633.912

Variability of crude rubber.

Industr. Engng Chem., 1948, 40: 311-16, bibl. 8.

h NEWTON, W. 633.491: 577.16
An indicator agar for the determination of the relative concentration of ascorbic acid in potato tuber tissue. *Abstr. in Phytopathology*, 1947, 37: 845.

specialist—not exclusive of the competent entomologist—must perforce rely upon the signs of attack to enable him to determine the causal agent. It is for this reason that readers will approve the author's emphasis in outlining in each case the biology and control of fruit-infesting species of *Cecidomyiidae* and that no undue prominence is given to minute scientific descriptions of each species.

A list is given (pp. 15-19) of the fruit crops attacked by gall midges, and in it will be found not only all the top and soft fruits grown in this country, but those cultivated elsewhere including both familiar fruits as banana, citrus, fig, mango, mulberry, olive and prickly pear, and those far less familiar including cherimoyer, guava, hog plum, jack fruit, jujube, pitanga and sea grape.

In most cases, each species is considered under paragraph headings, namely Diagnostic Character, Damage, Description, Distribution, Life History, Food Plants, Natural Enemies, and Control Measures. Three complete Indexes—Scientific, Host Plant, and General—are a refreshing and invaluable feature of the book.

The 17 figures arranged on 9 plates are excellent photographic reproductions of types of injury and of the male and/or females of three species of gall midge. The general format of the book maintains the high standard expected of this firm of publishers.

This volume provides an excellent guide to all whose interest lies in the production of clean fruit, both from the scientific, commercial and private growers' standpoints. The author is the acknowledged world authority on this group of insects, and his competence for the task of presenting the relative facts is mirrored in every paragraph. G.F.W.

1510. BAWDEN, F. C. 632.1/8
Plant diseases.
 Thomas Nelson & Sons Ltd., London, 1948,
 206 pp., 31 plates, 7s. 6d.

The present shortage in the world's food supply interests everybody, particularly, perhaps, those who are called upon to produce more and better crops, and it is obvious that every means of increasing food supplies should be utilized. One way is to reduce the ravages caused by parasitic organisms and nutritional disorders. *Plant Diseases* not only describes such factors inimical to crop production but also points the way to remedies. It is not a text-book of plant diseases and the author does not attempt to describe the numerous specific diseases of our crops. His object is to present a general survey of our present knowledge of the agents of plant diseases, of how diseases are brought about, and of the steps that are being taken to reduce their ravages. The first chapter describes the causes of disease in plants, with the chief characters of the agents, i.e. fungi, bacteria and viruses. Then follow chapters on the method of spread, by seed, in the soil, by air and by insects. "Alternate hosts" are mentioned not only with reference to the classic barberry and wheat, but also as existing in peach and potato, primula and tomato. Other chapters deal with nutritional disorders, the influence of environment on infectious diseases, genetics and plant diseases (variation and heredity breeding for disease resistance) and the control of plant diseases. Virus diseases, on which the author is a recognized authority, are described at some length, particularly with reference to the complexity of their relation to insect pests. Plant diseases in their various aspects offer a wide field for study, and the present book in outlining the outstanding features of the subject can be thoroughly recommended to all who are interested in cultivated plants in health and disease. The low price for a book of this calibre with its 31 excellent plates should be noted. H.W.

1511. CANADA, MINISTER OF AGRICULTURE. 63(71)
The Dominion Experimental Farms.
 Minister of Agriculture, Ottawa, 1947, pp. 53,
 illus.

This useful booklet gives a brief outline of the nature and scope of the work undertaken on these farms. An introduction on history, development and organization is followed by descriptions of the work being done on the Central Experimental Farm, Ottawa, and its branches throughout Canada. A map shows their situation. There is a short section on horticultural investigations and a list of stations where this work is carried out. A staff list shows the chief officers on Dominion Experimental Farms.

1512. CARTER, G. A. 635.1/9+634.1/7
Flowers, shrubs and fruit for the small garden.
 Littlebury & Co. Ltd., Worcester, 1948, pp. 86,
 illus., 9s. 6d.

As its title indicates, this little book deals with gardens of a few hundred square yards. The author has made a number of such gardens, and his recommendations are based on considerations of space. Among other sound points, the reader is advised to look over his neighbour's fence and profit by local experience. In each section of the book suitable varieties of each plant are suggested. The control of fruit pests and diseases is outlined. Having had to put up with a jet of lime-sulphur directed at the knees from the head of an old stirrup pump, we must question the recommendation that leaky washers should be replaced after spraying: in our experience it is better to do this beforehand.

1513. CULPIN, C. 631.3
Farm machinery.
 Crosby Lockwood & Sons Ltd., 3rd edition,
 1947, pp. 523, illus., 21s.

Mr. C. Culpin presents a comprehensive, well-illustrated survey of equipment in use on British farms. He is to be congratulated on producing a book that cannot fail to

become the student's "bible" of farm machinery and a reference work of great value to the farmer.

It is much more than a catalogue of representative types of machinery, in that sufficient information is given to assist the potential purchaser. The six appendices are of particular interest to those who require more exact information on fundamental mechanical principles and technical detail, and it is to be hoped that in future editions they will increase in size and scope, since it is just this type of information which is so scattered in the literature and hard to come by.

The decision on what types of equipment to include has proved difficult, and it is almost exclusively with agricultural types that the author deals. He does refer briefly to fruit spraying machinery, but omits reference to other important equipment used by the market gardener, fruit, hop and willow grower. It would seem expedient in future editions either to include such equipment as gang mowers, pruning sweeps, hop washers, fruit graders, etc., or confine the book to agriculture.

Reference is made to the latest type of unit principle mounting of tools on tractors. It is to be hoped that potential purchasers and manufacturers will take heed of the warning inferred in the pages devoted to market garden tractors, that walk-behind tractors have a limited future. On p. 148 a garden tractor with rotary tines is described with a remark indicating that it produces an undesirable type of seed bed; it is unfortunate that the type with hoe blades is not mentioned, as this is an excellent tool. Again, too brief mention is made of the specialized, self-propelled toolbar tractor which is likely to play a big part in developing large-scale market gardening. No mention is made of the serious pipe corrosion problems encountered in certain soils. Atomizing ("so-called") is mentioned, but not the dangers to some foliage of applying highly concentrated insecticides and fungicides. The statement that dusting must be done when flea beetles are jumping is incorrect, as DDT acts as a protective insecticide.

Chapter XXII on care and maintenance, a subject of the utmost importance, could be usefully extended, particularly with information based on first-hand experience. In the reviewer's opinion the farmer is well advised to buy fitter's tools in preference to power or specialized tools which he cannot use to full advantage.

The reference on p. 472 to engine depreciation due to crank case oil dilution by paraffin should be noted by all, even though opinions differ on this matter.

Shell bearings are rapidly replacing the adjustable shim type mentioned on p. 472.

In the section on paints, p. 489, the well-proven advantages of synthetic resin paints could be advantageously included. Taken all in all, it is a book to buy and keep.

H.G.H.K.

1514. DARLINGTON, C. D. [Editor]. 634/5: 631.5
The fruit and the soil. Being a collected edition of the *John Innes Leaflets*.

Oliver & Boyd, Edinburgh, 1948, pp. 62, 3s. 6d.
 These are, under one cover, leaflets previously issued by the staff of the John Innes Institution with one addition—for which see abstr. 1066.

They cover: Nos. 1-3, composts and propagating soil [see H.A., 15: 16, 462, 17], * No. 4, pollination of fruit trees [see H.A., 15: 40], and No. 5, tomato growing out of doors [see H.A., 14: 774]. They are of great practical value and are strongly recommended.

1515. DELBARD, G. 634.1/8(44)
Les beaux fruits de France. (The choice fruits of France.)
 Editions Georges Delbard, 16 Quai de la
 Megisserie, Paris, 1947, pp. 166, 429 photo-
 graphs, 32 coloured plates, Fr. 2,500.

In this magnificent production a close race is run between

* What was originally *Leaflet*. 6 appears here as *Leaflet*. 2.

beauty and utility. The coloured illustrations in the pomology section are quite the best the reviewer has ever seen, not even excepting Dahl's splendid reproductions in his Swedish *Pomology* (H.A., 15: 913).

But while the pomology with its descriptions and illustrations of varieties covers pp. 51-126, the rest of the book, composed largely of very clear photographic reproductions, is hardly less attractive and is equally useful. A secondary title, if it were required, might be "Fruitgrowing in pictures", since with their aid the reader is taken through every conceivable step in the fruitgrower's cultural work from choice of ground through propagation, pruning, thinning, bagging and harvesting to preservation and processing. A further 30 pages are devoted to fruit parasites and their control, all fully illustrated. These illustrations of technique are doubtless useful enough to a Frenchman, but they are doubly useful to the foreigner, who is so often nonplussed by even common technical expressions in a strange language. Many of his doubts will here be resolved.

The next best thing to eating some of the "beaux fruits" is to gaze at them with undisguised greed in perfect illustrations. Save up and buy a copy! D.A.

1516. EAMES, A. J., and McDANIELS, L. H. 581.4
An introduction to plant anatomy.
McGraw-Hill Book Co. Inc., New York and
London, 1947, pp. 427, 187 illus., bibl. numerous,
27s.

The first edition of this book was published in 1925. During the intervening years much progress has been made in certain aspects of plant anatomy and the results, inasmuch as they are within its scope, are incorporated in this new edition. It deals fairly comprehensively with the fundamental facts of the structure of vascular plants and includes a wide range of examples. It is essentially of academic interest and the botanist whose chief concern is the practical aspects of the science may consider the subject matter outside his sphere. To understand the physiological and cultural reactions of cultivated plants, in health and disease, however, one must have a knowledge of the fundamental principles of the structure of the various organs. Thus, a study of the effect of disease or of abnormal cultural conditions presupposes a knowledge of the structure of the organs in healthy plants under normal conditions. This will prove a useful reference book regarding the more important facts of plant structure, and the use of terms and opinions on the function of particular structural elements. In the earlier chapters the origin and development of the organs is described, in the later ones the various organs are taken in order—root, stem, leaf, flower, fruit and seed. The last chapter is devoted to ecological anatomy—the special structure of certain plants (xerophytes, epiphytes and hydrophytes) in relation to special environments, with brief references to parasites, epiphytes, saprophytes and mycorrhiza. H.W.

1517. FAES, H., STAEHELIN, M., and BOVEY, P. 632.9
La défense des plantes cultivées. (Protection of cultivated plants.)
Librairie Payot, Lausanne, 2nd edition, 1947,
pp. 644, illus., 12 Swiss fr.

The authors of this book are the former director, the botanist and the entomologist of the Station fédérale d'essais viticoles et arboricoles, at Lausanne, Switzerland. Each is a well-known expert in his own particular field of study and it can be assumed therefore that the information here imparted is authoritative. The first impression one gets on glancing through the book is of many excellent illustrations mostly from photographs, and of the wide range of subjects described in one volume. It covers the pests (insects, mites, nematodes, molluscs and rodents), the fungal, bacterial, and virus diseases, nutritional disorders and damage caused by the natural elements, on fruit trees and bushes, garden vegetables, nuts (walnut, hazel, chestnut),

cereals and forage crops of temperate regions and includes also those on tobacco and maize. Some important pests and diseases are, of necessity, treated briefly, but generally the essential points are brought out and methods of control are clearly indicated. Part I, after briefly discussing the classification of insects and fungi, gives a general account of their biology and of measures for controlling them. Part II is more specific and takes the crop plants in order, starting with the grapevine, the importance of which, in Switzerland, is indicated here, for it occupies some 70 pages of description and illustrations, or about one-ninth of the whole book. Other fruit crops take up 200 pages altogether. The book is written in easy French style and is apparently intended for the practical farmer and fruitgrower who should find it most useful. The English horticulturist or plant pathologist with a working knowledge of the French language will find much to interest him here, particularly in the different emphasis put on certain pests and diseases of Swiss crops when compared with those in Britain. Such major troubles as apple scab and codling moth are equally important in Britain and Switzerland and the approach to these problems is much the same in both countries. It is not so in other cases. Thus the Colorado beetle is given somewhat extended treatment (with drawings and a striking coloured plate), while the black currant gall mite (big bud) causes little damage in Switzerland and is dismissed in 4½ lines. Reversion in black currants is not mentioned at all, and the virus diseases of strawberry are merely given a passing reference to the effect that the strawberry aphid is a vector of certain viruses. The shot-hole disease of cherries in Switzerland is caused by *Clasterosporium carpophilum*; in Britain shot-hole of cherry and plum leaves is caused mostly by bacteria, and in this connexion it may be remarked that bacterial canker of stone fruit trees is not mentioned and is apparently absent from Switzerland unless it should prove to be one of the forms of "apoplexy", the cause of which is obscure. Sulphur-containing sprays are recommended for American gooseberry mildew, but there is no reference to sulphur-shy varieties of gooseberry, so this would appear not to be a serious problem, although a list of sulphur-shy apple varieties is given. That the book has been appreciated in Switzerland is shown by the fact that the first edition, published as recently as 1943, is already exhausted, the present edition appearing within four years of the first. H.W.

1518. HALL, A. D., and SMITH, A. M. 631.8
Fertilizers and manures.
John Murray, London, 4th edition, 1947, pp. 333,
illus., 9s.

This classic of the practical agriculturist has worn well since its first appearance nearly 40 years ago. Dr. Smith has left unchanged the lucid, basic accounts on which generations of students have been soundly educated, but has most usefully noted recent progress towards the better use of potassic and phosphatic products and has brought the story up to date in other sections where necessary, particularly in that on valuation and prices. Growth substances and their possible importance from a nutritional standpoint and what is known of different trace elements are also included. Even in its economy garb the book seems cheap at 9s.

1519. MEURMAN, O., and COLLAN, O. 634.1/7(471.1)
Suomen hedelmäpuut ja viljellyt marjat. I. Omenat. (Finnish tree fruits and cultivated berries. I. Apples.)
Oy Suomen Kirja, Tilgmannin kirjapaino,
Helsinki, 1946, pp. 499, illus., bibl. 27.

After a general introduction of 83 pages dealing with various aspects of apple cultivation, biology and cytology, the rest of the book is devoted to descriptions of some 140 varieties of apple. Twenty-five of these varieties are shown in beautiful coloured plates, and there are many other illustrations in the text to show the habits of the trees, and the

shape and general morphology of the fruits. Data on chromosome numbers and vitamin C content are given in an appendix, and tables of yields are also included.

1520. MEURMAN, O. 634.1/7(471.1)
Suomen hedelmäpuut ja viljellyt marjat. II. Päärynät, luumut, kirsikat ja marjat. (Finnish tree fruits and cultivated berries. II. Pears, plums, cherries and berries.)

Oy Suomen Kirja, Tiilgmannin kirjapaino, Helsinki, 1947, pp. 351, illus., bibl. 122.

Each of the four sections has a brief introduction, the rest being taken up with descriptions of varieties. Section 4 includes gooseberries, black, red and white currants, raspberries and strawberries. As in Vol. I (see above, abstr. 1519) of this series, some of the varieties are shown in excellent coloured plates (56 in this volume), and there are 80 text figures, mostly from photographs. In the appendix are tables of yields.

1521. MILES, H. W., AND MILES, M. 632.6/7: 631.544
Insect pests of glasshouse crops.
 Crosby Lockwood & Son Ltd., London, 2nd edition, revised 1948; pp. 200, illus., 15s.

The second revised edition of this book is very welcome, since the work appeared first in 1935 and much of the information has long since become out of date.

In the preface to the second edition the authors rightly point out that "revision at this time has been particularly difficult". They refer, of course, to the advent of the new insecticides, many of which are being tested against glasshouse pests; as yet the investigations have not reached a stage where, for example, DDT or benzene hexachloride can be recommended instead of the older established insecticides already in use. A further example is to be found on page 49 where Azobenzene—one of the newer insecticides—is dismissed casually in a couple of lines, at a time when it is being used commercially and is found to be very effective against the greenhouse red spider under glass. The book has been enlarged by twenty-six pages, and three plates have been added. The text figures have been reduced by three.

Whilst much of the old text remains, some notable additions have been made, particularly in the paragraphs dealing with control measures. Here the value of DDT and benzene hexachloride are referred to, and this should prove of immense value to those tending glasshouse crops.

Chapter two of the new edition, entitled "Methods of Pest Control in Glasshouses", has been enlarged, and paragraphs relating to spraying apparatus for use under glass, insecticidal dusts and dusting apparatus and approved insecticides are included.

Mushroom mites are referred to on pages 158 and 159, the information being a little more detailed than in the original work, but one wonders whether the experienced practical mushroom grower of Kent and elsewhere will follow the advice given.

In common with all Crosby Lockwood's publications the arrangement is very good, and reference to any pest or crop can be obtained with ease. The index is very complete, and a selected bibliography enables the student to refer to other authorities on the pests concerned.

Dr. and Mrs. Miles are to be congratulated on bringing the book up to date in such an able manner, and doubtless it will reach a very large public. 'It is to be hoped that the authors will write yet another edition in a few years' time, when the place of the new synthetic insecticides in the role of pest control of glasshouse crops has become established. The price of the book is 15s., and this is quite reasonable in the present circumstances.

A.M.M.

1522. NEILSON-JONES, W. 581.14
The growing plant.
 Faber & Faber, London, 1948, 206 pp., illus., 16s.

As stated in the preface this is in no sense a botanical textbook, and it is not drawn up on the usual text-book lines.

"One of its objects is to provide the non-botanist with information about a number of aspects of plant life that in the author's experience provoke general interest", and, in the opinion of the reviewer, Professor Neilson-Jones should succeed admirably. The aspects selected are mostly some which have been investigated intensively in recent years, and of which information is obtainable in many cases only from scientific journals and monographic publications not readily available to the ordinary reader. The subjects are such as might excite the interest of the intelligent gardening citizen, and are in fact sometimes mentioned in popular articles, but they have also a particular bearing on agricultural and horticultural practice. Thus there are chapters on plant chimaeras, growth hormones, and photoperiodicity in plants, while Chapter 5 discusses plant nutrients (mineral nutrients, trace elements, deficiency disorders, soilless culture), followed by one on plant growth in soil—problems relating to the function of humus and the parts played by bacteria, fungi and earthworms (it may be news to many growers that in California and elsewhere there are "worm-farms"). The role of soil organisms is described at some length, not only in relation to the "nitrogen cycle" and other chemical changes in the soil but also with reference to mycorrhiza, those fungi which live in symbiosis with roots and assist in the nutrition of the host plant, a subject on which the author himself is a known authority. The last chapter, on pollination, fertilization and parthenogenesis, has a section on mutations and polyploids. This is followed by a glossary of terms that to the non-botanical reader may be unfamiliar. Although it is written particularly for the non-botanist, many botanists, professional, amateur, and "applied", will find the book stimulating, for they are often specialized and apt to lose touch with aspects of botanical research outside their own special niches. The grower will find it useful, for although it does not describe farm operations except occasionally when their mention is relevant to the subject under discussion, it will enable him to understand the factors underlying those operations that have proved successful from long experience or have been recently introduced as a result of research (e.g. stratification of seeds, the use of ethylene in ripening fruit, breaking dormancy in potatoes and in flowering bulbs, etc.). The horticulturist will find the sections on plant hormones in their relation to rooting cuttings, on pollination, and on polyploids and their production, particularly illuminating. The book can be thoroughly recommended to all who are interested in the growing plant, and particularly those engaged in cultivating plants. There are a few misprints and transpositions (see, for instance, p. 19, lines 15 and 16), but these in no way detract from the intrinsic value of the book.

H.W.

1523. RIJKSTUINBOUWVOORLICHTINGSDIENST. 634/635(492)
Tuinbouwgids voor 1948. (Horticultural guide to the Netherlands for 1948.)
 The Hague, Holland, 1947, pp. 784, illus., f. 3.50.

The 1946 edition of this useful guide was noted in *H.A.*, 16: 1202. The edition for 1948 has been enlarged by some 200 pages, mainly to accommodate new material. The diary is now followed by eight sections, separated by heavy coloured pages, and the usefulness of an improved index is increased by the bold type now used for pagination. The new material includes an up-to-date horticultural bibliography (pp. 238-48), directions for the application of pure or commercial growth substances to tomato flowers (p. 406) and notes on first aid. A better paper seems to have been used, for the print is more legible and the illustrations are clearer than in the earlier edition.

1524. SALTMARSH, E. R. 631.544
Glasshouse food crops.
 Crosby Lockwood & Son, London, 2nd edition, 1947, pp. 154, illus., 12s. 6d.

This book [for review of 1st edition see *H.A.*, 16: 1701], despite a few alterations, still disappoints, being inclined to rather vague generalities where specific advice would be welcome. Costs considered are still pre-war. Many will be grateful for the chapter on erection of glasshouses, but the ideal glasshouse book for this country still remains to be written.

1525. SHOEMAKER, J. S. 635.1/7

Vegetable growing.

John Wiley, N. York; Chapman & Hall, London, 1947, pp. 506, bibl. 144, illus., \$4.50; 27s.

The author is Professor of Horticulture at Ontario Agricultural College and this book is based on his experience in teaching and research in the United States and Canada. It is designed to fit into a general syllabus of horticultural training and the emphasis is very much on the vegetable, soils, pests and diseases, etc. being mentioned only as they affect the particular crop. Much practical detail is given on each crop so that the book will be of as great value to the grower as to the student. There may still be some doubt as to whether the egg came before the chicken, but where vegetables are concerned good seed is essential; the first chapter deals with seed production, which became essential in North America during the war, and seems likely to be of continued importance there. This section, containing some 60 pages, will be of particular value to those of our readers who are concerned with the production of vegetable seeds. Throughout the book vegetables are treated in the following groups: perennial vegetable crops, corn, roots, legumes, bulbs, salads, greens, coles, potato, sweet potato, solanaceous fruits, vine crops (the cucurbits) and miscellaneous, including mushrooms and herbs. Information about each crop is set out under main headings—historical, classification and varieties, description, cultivation, harvesting and storage. Information on soils and fertilizers is given for each crop; the control of pests and diseases is discussed in the last chapter, as they affect groups of crops or individual crops. A great deal of scattered information has been assembled in this work, which should fulfil its object as a source of reference and in teaching. G.K.G.C.

1526. SWYNNERTON, R. J. M., AND BENNETT, A. L. B. 633.73

All about KNCU coffee.

Moshi Native Coffee Board, Tanganyika, 1948, pp. 211, bibl. 31, shs. 5.00.

This attractive publication, which reflects great credit on the enterprise of its authors, is published by the Moshi Native Coffee Board for the benefit of the Chagga coffee growers who farm the lower slopes of the great Kilimanjaro and dispose of their crop as "KNCU" coffee through the Kilimanjaro Native Co-operative Union—a remarkably successful African organization with a European executive officer. The main policy of the Board, according to the foreword, is to increase the cash income of native growers by increasing coffee yields per acre, largely through the replacement of existing coffee bushes by improved strains of arabica selected by the Coffee Research Station, Lymungu. Short opening chapters on the history and value of coffee and the organization of the Chagga coffee industry are followed by highly practical sections, written in very simple language, dealing with all the operations of coffee cultivation, coffee pests and diseases, the preparation of the crop by the grower, and its final preparation for market at the curing works. The short chapter on coffee soils is by H. B. Stent. The admirably clear drawings of various nursery and plantation operations as well as the full-page photographs and the map of the coffee growing districts of East Africa add to the value of this very instructive book. It is in two parts, English and Kiswahili, so that apart from the purpose for which it was written, it should prove extremely useful to the newcomer to East Africa who is learning Kiswahili, as well as to the African struggling to learn English.

1527. TYSSER, H. F. (Editor). 634(42)

The fruit annual and directory 1947-8.

British Continental Trade Press Ltd., 222 Strand, London, 1948, pp. 323, £1 post free.

The fruitgrower and fruit handler will welcome the reappearance of this annual, last published in 1938. The advisory officer and information service will be no less glad to have it at hand when answering some of their many enquiries. The following are among the more important subjects considered: The world's fruit trade [by countries], market fruits and their varieties, world production of deciduous fruits, world trade in tropical fruits, air transport of fruit, storage problems including those of quick freeze methods, canning in the Empire and U.S.A., packing, fruit juice concentration, the dried fruit trade, trade in nuts, fruit trade organizations in different countries, the London markets of Covent Garden and Spitalfields, a dictionary of commercial fruit terms in English, French, Spanish and German, list of merchants in different branches of the fruit trade in countries supplying the U.K. with fruit. The figures given are up to date. There is little theory but plenty of fact.

1528. U.S. DEPARTMENT OF AGRICULTURE. 63(73)

Science in Farming. Yearbook of Agriculture 1943-47.

Supt. Documents, Washington, D.C., 1947, pp. 944, illus., \$2.00.

This latest yearbook of the United States Department of Agriculture, covering the period 1943-47, is devoted almost entirely to the results from research and the application of science to farming practice. The book contains an immense amount of valuable information in the form of 135 short, simply written articles grouped under the following heads: backgrounds, animals, plants, trees, soils, insects, new products, food and clothing, new practices, and conclusions. Abstracts from 29 of these articles appear in their appropriate place in this number of *H.A.* The excellent photographic illustrations maintain the high standard set by earlier issues of this unique yearbook.

1529. WELLENSIEK, S. J. 631.523

Grondslagen der algemeene plantenveredeling. (Principles of general plant breeding.)

H. D. Tjeenk Willink & Zoon N. V., Haarlem, 2nd edition, 1947, pp. 541, illus., 18.75 guilders.

Military activities at Arnhem led to the evacuation of Wageningen and prevented the appearance of this edition in 1944. Professor Wellensiek has taken advantage of the enforced delay by adding a few pages describing recent work and making one or two corrections. The first part of the book covers the background of plant breeding and sets out six general methods of breeding and selection which depend on the reproductive behaviour and possibilities of the subject. Each method is then described in detail as applied to a particular crop; what makes this book of interest to our readers is that the crops chosen are potato, beet, oil palm, tobacco, tea and rye. The two last crops are dealt with by the author, the others by collaborators; and a chapter on heterosis is also contributed. The material is well ordered and the production excellent. G.K.G.C.

1530. WOOD, R. C. 551.566.1: 63

A note-book of tropical agriculture.

Imperial College of Tropical Agriculture, Trinidad, 1947, 4th edition, pp. 147, 7s. 6d.

Among many other things, this little book contains much condensed information on vegetables and plantation crops grown in the tropics. Clearer type has been used, but otherwise there is little change in this fourth edition, which is a reprint of the third. In fact one or two mistakes have crept in: thus under the candlenut on p. 83, "plantation crop to be 7 to 8 nuts per acre" has little meaning. The section on recipes could now be improved by the inclusion of the newer fungicides, insecticides and weed killers, some

of which have been tested thoroughly in many climates. Nevertheless, 'Wood' remains a useful and really portable vade-mecum for the isolated agriculturist in the tropics.

1531. BANGA, O., AND OTHERS.

634/635: 631.523(492)

Algemene veredelingsdagen 1946: Verslag van de voordrachten. (General plant breeding days: report of addresses.)

Meded. Inst. Vered. Wageningen 4, 1947, 80 pp.

After three general articles this report consists of papers on more specific subjects by members of the staff on the following subjects:—

BANGA, O. Perspectieven voor de veredeling van tuinbouwgewassen in Nederland. (Aspects of horticultural plant breeding in Holland.) pp. 10-20.

WELLENSIEK, S. J. De methode der herhaalde terugkruisingen. (Methods of repeated backcrossing.) pp. 20-31.

PRAKKEN, R. Een en ander over plantenveredeling in Zweden. (Plant breeding in Sweden.) pp. 32-50.

NANNENGA, E. T. Ervaringen bij de identificatie van vroege kersenrassen. (On the identification of early cherry varieties.) pp. 51-4.

There are at least 5 varieties of cherries which ripen before Early Rivers. Of these only Fröhste der Mark is fairly widely distributed, the others being met with in a few orchards only. There is great confusion in the nomenclature of cherry varieties.

DE SONNAVILLE, P. Nieuwe fruitrassen, die in Nederland op de voorgrond treden. (Promising new fruit varieties.) pp. 54-60.

Notes on new varieties of Dutch or foreign origin of apples, pears, plums and cherries, which are promising for conditions in Holland.

FLOOR, J. Nieuws op het gebied van fruitrassen in Engeland. (On English fruit varieties.) pp. 60-6.

A survey of English fruit varieties and rootstocks with notes on new varieties and methods of testing them.

KRONENBERG, H. G. Selectie van aardbeien op gezondheid. (Selection of healthy strawberry runners.) pp. 66-8.

Notes on the selection of healthy runners, research work along this line, and the organization of selection work on the farm.

VAN DER HEIDE, R. Ervaringen bij het kweken van ziekteresistente tomatorassen. (The breeding of resistant tomato varieties.) pp. 69-72.

A survey of the tomato breeding work carried out in Holland with the object of raising varieties resistant to *Cladosporium fulvum*. Vetomold was resistant during the first three years after its introduction into Holland (1939) but not afterwards, neither were its descendants. New crosses will be made.

HUBBELING, N. Ervaringen bij het kweken van ziekteresistente bonenrassen. (Breeding mosaic resistant bean varieties.) pp. 72-5.

U.S. 5 Refugee was used as a source of mosaic resistance. Methods and results are described.

SNEEP, J. Photoperiodiciteit, vernalisatie en veredeling. (Photoperiodism, vernalization and plant breeding.) pp. 75-80.

A discussion of the problems.

1532. BRITISH WEST INDIES.

633.61(729.8)

Twelfth Annual Report British West Indies Central Sugar Cane Breeding Station, Barbados, 1945, pp. 45 [received 1947].

The progress of sugar-cane breeding and seedling selection trials is set out, for the most part in tabular form. In select seedling trials conducted at several centres the outstanding variety was B 4121, which in almost every case gave significantly greater yields of sugar per acre than the control, B 37161. Other promising varieties in these trials were B 4098, B 37193 and B 41227. Six B 42 seedlings were sent

to the Plant Quarantine Station, Trinidad, prior to distribution to various British Colonies. Results from variety trials with B varieties in Trinidad indicate that B 34104 is suitable for moist loams and clays, while B 3337 is likely to do better in light soils on the flat or in heavier soil on dry slopes. Figures giving the areas under the different sugar-cane varieties harvested in Trinidad from 1941 to 1945 show that 28.5% of the total area harvested in 1945 was under the old Indian variety CO. 213, 24% under B 34104 and 21% under BH 10(12). The recent performance of some of the newer B seedlings in Antigua, St. Kitts, Jamaica and the Windward Islands is reported. Research to discover a satisfactory technique for the artificial transmission of sugar-cane mosaic disease was continued and progress reported. Investigations to determine the border-effect around plots of various sugar-cane varieties differing in vegetative vigour indicated that, although the difference between inside and outside rows may vary considerably in any trial, the order of merit of the varieties does not differ appreciably when calculated on (1) the inside rows of the plots (with border row discarded) and (2) the complete plots.

1533. CANADA.

633/635(71)

Report of the Minister of Agriculture, Dominion of Canada, for the year ended March 31, 1947, 1947, pp. 257, 50 cents.

Almost three-quarters of this very informative volume is devoted to the divisional reports of the Science and Experimental Farms Services, the remainder being given over to production, marketing and administration. A useful chart illustrates the organization of the department of agriculture. A précis entitled "Highlights of the Year's Work" introduces the numerous reports in the science section from which the following items are taken: Two seedlings of Russian dandelion (*Taraxacum kok saghyz*), bred in 1945, proved to have superior rubber content and high vigour. The new potato variety, Teton, was found to be highly resistant, but not immune, to bacterial ring rot. The co-operative potato breeding programme at Fredericton N.B. reached the stage where a number of promising seedlings resistant to leaf roll, late blight and scab are being tested at selected stations across Canada. Several strains of stone fruit varieties have been found which are free from virus infection. It was demonstrated that *Ascochyta pist*, the cause of a serious leaf- and pod-spot of peas, comprises at least three races. Benzene hexachloride (666) was found to be an extremely promising insecticide for controlling soil insects. It is also the most effective one yet tested for the control of aphids in orchards. Although tests confirm that DDT is the most effective material yet discovered for controlling codling moth, it cannot yet be recommended for general use in orchards. As a result of experimental work, magnesium oxide is now largely used in Canada for protecting seeds of all types before and after packaging. Detailed data are now available on the percentage frequency of 325 species of weeds across Canada. The Division of Horticulture reports on the following: The production of apple hybrids (Crimson Beauty × Melba) which are as early as Crimson Beauty and practically as good in quality as Melba. Of these hybrids O-272 and O-277 are outstanding for their earliness, size, colour and quality. The high-quality plum hybrid Algoma (*Prunus besseyi* × Burbank) proved of much merit, particularly in the more severe districts of Eastern Canada, and appears to be one of the best green-fleshed, sand cherry hybrids yet produced. Investigations extending over 7 years show that harvest sprays offer promise for the control of pre-harvest drop of apples. Their retarding effect may, however, vary with variety, time of application, coverage, concentration, weather, severity of drop, and season. Plant tissue tests were continued, as a result of which the optimum nutritive requirements of the potato growing on muck soils were established. The most efficient system for maintaining organic matter in orchards appears to be the sod-mulch

system. Small scale greenhouse trials have shown that, with proper manipulation, successive crops of chrysanthemums can be produced throughout the year. A new yellow lily, Sovereign, has been bred.

1534. CYPRUS. 633/635(393)
Annual Report of Department of Agriculture, Cyprus, 1946, 1947, pp. 12, 2s.

Deciduous fruits. Variety trials have now reached the stage at which definite recommendations can be made on the best kinds of apples, pears, plums, peaches, cherries and nectarines for the higher hill villages. *Viticulture.* Trials with American phylloxera-resistant rootstocks are reported. *Citrus.* Efforts were concentrated on the production of early tangerines and late oranges with the object of extending the citrus season. Promising results followed the use of the leaf-stalk injection method for detecting mineral deficiencies in citrus. *Vegetable seeds.* The scheme for encouraging the production and export of temperate region vegetable seeds made encouraging progress. *Potatoes.* In trials with new varieties from Northern Ireland, the standard local variety, Up-to-Date, maintained its reputation for superiority under local conditions. *Herbicides.* Methoxone proved effective in destroying charlock and most leguminous weeds, but was ineffective against chrysanthemum species, cleavers, oxalis and broomrape.

1535. GEORGIA. 634/635(758)
Fifty-ninth Annual Report Georgia Experiment Station, 1946-47, pp. 144, illus.

Horticulture. In peach pruning experiments significantly higher yields were obtained in the first year from open centre trees than from trees pruned on the modified leader system. Benzene hexachloride and hexaethyl tetraphosphate are showing much promise as possible substitutes for lead arsenate in peach sprays. In peach canning and freezing tests the variety Dixgem was outstandingly good. Other good varieties were Triogem, July Elberta and Sunhigh. The breeding of muscadine grapes continued, the primary object being the production of self-fertile varieties equal to or better than the standard pistillate kinds. The progress of dewberry and blackberry breeding is recorded. The following are reported: yield trials with snap and lima beans, spacing and manuring experiments with asparagus, irrigation trials with vegetables.

1536. MAURITIUS. 633.61(698.2)
Seventeenth Annual Report Sugarcane Research Station, Mauritius, 1946, 1947, pp. 56, 75 cents.

This report emphasizes the dominant part played in the sugar industry of the island by the improved cane varieties bred and selected by the Station since it opened in 1930. The variety M 134/32 in particular has proved of outstanding merit. Details of the crosses made and of seedlings raised during the year are given, as well as the results of numerous yield trials with new varieties. Chemical work was largely directed towards the study of foliar diagnostic methods. Twenty manurial field trials were in progress. Although the results of any manurial field trial may be applicable to soils in close proximity to the experiment, it is necessary to have some other method on which to base fertilizer recommendations. Foliar diagnosis is said to provide this. It was shown that the index of vegetative growth in fresh leaf samples taken from canes in field trials were highly correlated with the final cane yields. It is believed that this index may be as accurate as final cane yields as an indicator of fertilizer response. Investigations on foliar diagnosis, the chemical composition of the whole cane plant, and the composition of molasses are reported. In foliar diagnosis tests leaf-punch samples from leaf laminae are now used for analysis, instead of whole leaves. Botanical investigations were mainly confined to weed control investigations; see *H.A.*, 17: 2567.

1537. MISSISSIPPI. 63(762)
Highlights of the work of the Mississippi Experiment Station, being Fifty-eighth and Fifty-ninth Annual Reports of the Mississippi Agricultural Experiment Station for years ending 30 June, 1945 and 1946, pp. 47 and 51, illus. [received 1948].

The horticultural sections of these reports, 6 pages in all, contain very brief notes on experimental work with pome and stone fruits, grapes, sweet potatoes, potatoes, cucumbers, tomatoes, sweet corn and beans.

1538. NORTH CAROLINA. 63(756)
Research and Farming 1946, being Sixty-ninth Annual Report of N.C. Agricultural Experiment Station, pp. 135, illus. [received 1948].

Agricultural engineering: A successful portable crop drier suitable for seeds, was developed. This has an oil-burning heater and fan. Its capacity is 20 to 30 thousand cub. ft. of air, raised by 30-40° F., per minute. *Horticultural crops:* Abnormalities of strawberry leaves caused by manganese and zinc deficiencies are described. In strawberry variety tests carried out at two centres over two years NC 1012 (early) gave significantly better yields than the others tested. Of 39 potato varieties under trial, 8 exceeded 500 bushels per acre, Sequoia and Sebago yielding 588 and 545 bushels respectively. Hexaethyl tetraphosphate is reported as one of the most promising of the new materials for use against mites in apple orchards. The results from tests of the following substitutes for lime-sulphur and bordeaux mixture in apple orchards are reported: Phygon, Fermate, Sulphur (paste) and fungicide 341. The following tests are also reported: DDT against peach tree borer; benzene hexachloride against plum curculio; chloropicrin, D-D and Uramon against peach root-knot.

1539. NOVA SCOTIA FRUIT GROWERS' ASSOCIATION. 634.1/7(716)
Proceedings of the 84th Convention of the Nova Scotia Fruit Growers' Association, 1947, pp. 168.

Speakers at this meeting covered a wide range of apple problems. Varieties.—Economic circumstances make it essential to change over to varieties of apple suitable for the Canadian market, partly by top-working varieties, such as Stark, that are no longer profitable. Rootstocks.—To provide seed for rootstocks to replace French crab, the varieties Antonovka and Beautiful Arcade are to be planted at the Dominion Experimental Station, Kentville. Disease control.—Bordeaux and the sulphurs remain in general use against diseases; Fermate, Phygon and phenyl mercury chloride are being tried against scab. Early observations are reported on a long-term comparison of the effect on pest populations of sulphur and copper fungicides. Other topics discussed include storage problems and soft fruit variety trials.

1540. QUEENSLAND ACCLIMATISATION SOCIETY. 634/635(943)
Eighty-first Report of the Queensland Acclimatisation Society for 1946-1947, 1948, pp. 17.

Notes on custard apples, soya beans, avocados and other crops and their growth at Redland Bay.

1541. ROYAL METEOROLOGICAL SOCIETY (GUNTON, H. C.). 551.51: 633/635
57th Phenological Report 1947. Suppl. Quart. J. roy. met. Soc. 74, 1948, pp. PR31.

The prolonged snow cover and cold, unless weather that prevailed over much of Great Britain at the beginning of 1947 held up most of the spring responses of plants and animals; when the weather became warm there was marked crowding in time of these responses, many of them long overdue. Vegetation recovered markedly, until drought occurred later in the summer.

1542. TEXAS. 63(764)
*59th Annual Report of Texas Agricultural
 Experiment Station 1946, 1947* [?], pp. 104.

Progress is discussed with regard to the following, among many other subjects: Breeding peaches for a mild climate. Nothing definite as yet but considerable promise. Early characteristics of certain crosses are noted. A new downy mildew-resistant, Cantaloupe K-15 has been evolved. *Crotalaria spectabilis* has proved excellent as a cover crop for worn out, sandy soils. It is immune to root-knot nematode. Safflower is found to grow well in Texas. It gives a desirable edible or paint oil. The Red Cloud tomato, originating in Nebraska, is found admirably suited to the hot dry atmospheric conditions of N.W. Texas.

1543. TRINIDAD AND TOBAGO. 63(729)
Administrative Report of Director of Agriculture, Trinidad and Tobago, 1946, 1948, pp. 28, 60 cents.

The following items are taken from the section of the report dealing with experimental work. *Cocoa*. Varieties have been selected which promise to be resistant to Witches' Broom and to yield well. Experimental attempts to control this disease by bordeaux spray were disappointing. Active steps were taken to control the spread of the virus disease of cocoa first noted in 1941. *Sugar-cane*. New varieties bred by the B.W.I. Central Sugar Cane Breeding Station in Barbados are rapidly ousting the older varieties, so that in 1946 B.34104 and B.3337 occupied almost 50% of the total cane area. The results from field experiments, over 40 in number, will be recorded in Field Experiments on Sugar-cane in Trinidad, Annual Report for 1946. *Citrus*. Experiments were started on the control of dieback leaf symptoms through mineral nutrition. A severe decline of citrus on one estate was arrested and the yield doubled by cutting out phosphate from the fertilizers normally applied and increasing the amount of nitrogen. An unusual pest in the form of tree snails [not named] did considerable damage to the bark of citrus in one locality. Another unusual citrus pest, a Colonial spider [not named], was reported, particularly from the S.W. peninsula. Limes continued to die out throughout Trinidad. It is believed that a survey of the position as a result of a recent questionnaire may narrow the field for investigation considerably. *Cocoanuts*. A scheme for improving this crop by the selection of high yielding palms on estates was generally accepted. Bronze leaf wilt is still to be found in various parts of the island. Red Ring caused by nematodes appears to be on the increase. *Rubber*. Double-budding experiments were continued in which the seedling stock is first budded with a high-yielding Far Eastern clone, to form a tapping panel, and later with a top clone of the Ford-Brazil type, resistant to leaf-blight. The final [Hevea] tree is therefore made up of a local stock, a high-yielding panel and a disease-resistant top. A list of approved clones is given. *Papaw*. Experiments on the effect of manurial treatment on papaw mosaic disease proved inconclusive but showed that very heavy yields could be obtained as a result of manuring, in spite of the presence of this disease. *Weed control*. "Methoxone has in general proved of little value in weed control in Trinidad."

1544. UGANDA DEPARTMENT OF AGRICULTURE. 63(676)
Annual Report of the Uganda Department of Agriculture (Experimental Work) for the period 1st July 1945-31st March 1946, 1947, pp. 92, 3s. [received 1948].

The 12 sectional reports enclosed contain brief notes on the progress of experimental work with coffee, cinchona, derris, potatoes, sweet potatoes, peas, beans and other crops.

1545. UNION OF SOUTH AFRICA. 63(68)
Report of the Department of Agriculture of the Union of South Africa for the year ended 31 August, 1947.
Fmg S. Afr., 1947, 22: 919-1184.

This very informative report is divided into three main sections: A, the report of the Secretary of Agriculture; B, reports of scientific divisions; and C, reports on crops and markets. Section B includes reports from officers in charge of the following: the Agricultural Research Institute, Pretoria; horticulture, fruit research station and cold storage; botany and plant pathology, entomology; low temperature research. [See abstracts 791, 833, 1205].

1546. WASHINGTON STATE HORTICULTURAL ASSOCIATION. 634/635(797)
Proceedings of the 43rd Annual Meeting of the Washington State Horticultural Society, 1947, pp. 302.

The control of orchard mites was discussed by two speakers; one of the more promising chemicals still being tested for this purpose is parathion, *o-o*-diethyl *o-p*-nitrophenyl thiophosphate, also known as Thiophos-3422 and AATP. The use of boron and zinc to correct deficiency disorders was discussed. Papers on spray equipment indicate a general trend towards the use of lighter, high-speed low-volume machines; on this topic there is a progress report from British Columbia. Other speakers discussed the control of pests and diseases, the use of fertilizers, and the harvesting and storage of fruit.

1547. DE BAKKER, G. 634.1/2(492.91)
Resultaten van "Zeeland's Proefuin" te Wilhelminadorp over de jaren 1927-1943. (The work of the Zeeland experiment station during the years 1927-1943.)
 Van Liere & Korstanje, v.h. Kleeuwens & Zoon, Goes, 1948 [?], pp. 112.

This account of the work of the Zeeland experiment station from 1927 to 1943 includes a description of the layout of the station; it is to be followed by a report for 1944 to 1947 and thereafter it is hoped to issue reports annually. Apple rootstock trials.—Belle de Boskoop and Cox's Orange Pippin worked on EM I to EM XVII (except EM XIII) were planted in the winter of 1925-26. A second trial was planted in 1935, using six varieties on the EM stocks I, II, IV, IX, XIII and XVI. Pear rootstock trials.—The first trial involved 7 varieties and 21 rootstocks. In the second various combinations of 11 varieties and 9 stocks were planted, some combinations being double-worked with Beurré Hardy as intermediate. Plum rootstock trial.—Four varieties were planted on 12 stocks. Plum variety trial.—Thirteen varieties on 4 stocks. Black currants.—Five varieties were grown between the young top fruit. In each trial the effects of stock on vigour and yield are discussed. A Latin Square was laid down in 1943 to compare ten apple varieties, each plot containing one individual on II and three on IX.

1548. The following also have been examined:

- a MAURITIUS.
Annual Report of the Mauritius Department of Agriculture 1945, 1946, pp. 34, 50 cents [received 1948].
- b *Combined Proceedings of 23rd National Shade Tree Conf. Cleveland, Ohio, and 14th Western Shade Tree Conf. Berkeley, Calif.*, 1947, pp. 385.
- c RUBBER RESEARCH INSTITUTE OF MALAYA. 633.912

Annual Report of the Rubber Research Institute of Malaya, 1940, 1947, pp. 181.

An abridged form of this report was issued in 1941. See H.A., 12: 716.